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U. S. DEPARTMENT OF AGRICULTURE.
DIVISION OF ECONOMIC ORNITHOLOGY AND MAMMALOGY.
BULLETIN 1.

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THE

ENGLISH SPARROW

(PASSER DOMESTICUS)

IN [redacted],

Smithsonian Institution
318
Zoological Park

ESPECIALLY IN ITS RELATIONS TO AGRICULTURE.

Prepared under the direction of
DR. C. HART MERRIAM, ORNITHOLOGIST,

BY

WALTER B. BARROWS,
ASSISTANT ORNITHOLOGIST.

WASHINGTON:
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1889.

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
DIVISION OF ECONOMIC ORNITHOLOGY AND MAMMALOGY,
Washington, D. C., April 14, 1888.

SIR: The investigations in economic ornithology and mammalogy ordered by Congress to be made under your direction consist of two separate inquiries, namely: (1) concerning the food habits of birds and mammals in their relation to agriculture; and (2) concerning the migration and geographical distribution of North American species.

It has been deemed best to publish the results of these investigations in separate bulletins. In accordance with this decision I transmit herewith, as Bulletin 1 of the Division of Economic Ornithology and Mammalogy, a report upon the English Sparrow in North America, by Walter B. Barrows, assistant ornithologist.

Respectfully,

C. HART MERRIAM,
Ornithologist.

HON. NORMAN J. COLMAN,
Commissioner of Agriculture.

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PREFATORY LETTER.

The English Sparrow question in North America has grown to be a serious problem in economic science, particularly so far as the agricultural interests of the country are concerned—and the term agriculture must be here understood in its broadest and most comprehensive sense as including the grain-growing industries, truck-gardening, fruit-growing, the cultivation of flowers and ornamental shrubs and vines, and even forestry. It was deemed proper, therefore, that this question should be made the subject of the first bulletin of the newly established Division of Economic Ornithology and Mammalogy.

The information necessary to a complete understanding of the subject has been collected with great care; the evidence submitted has been honestly weighed, and the results impartially stated.

The labor of collecting and arranging for publication the matter contained in Part II, together with the authorship of most of Part I, has fallen upon my assistant, Mr. Walter B. Barrows.

Brief portions of Part I, including the tables relating to the increase and spread of the Sparrow, were prepared by myself and are here reproduced without quotation marks from my annual report for 1886. Section 2 of Part I, consisting of recommendations for legislation and recommendations to the people, has been written jointly by Mr. Barrows and myself.

Prof. C. V. Riley, Entomologist of the Department, has kindly contributed a full and valuable report on the Insectivorous Habits of the English Sparrow, based chiefly on the examination of stomachs submitted to him by this Division.

Section 4, on the Destruction of Sparrows by Poisons, was prepared by Dr. A. K. Fisher, assistant ornithologist, by whom the experiments were conducted.

Section 5, on Trapping the Sparrow, was contributed by Mr. W. T. Hill, who makes a business of trapping Sparrows in Indianapolis, Ind. The cuts illustrating Mr. Hill's article, together with the description of the apparatus used, were taken from the American Field of January 14, 1888.

Section 6, treating of both the English Sparrow (*Passer domesticus*) and the European Tree Sparrow (*Passer montanus*) in Saint Louis, Missouri, was contributed by the well-known ornithologist, Mr. Otto Widmann. This article is particularly instructive inasmuch as it emphasizes the contrast in disposition and habits of two closely related European birds which were brought to Saint Louis at about the same time.

The present report, as a whole, is believed to be the most systematic, comprehensive, and important treatise ever published upon the economic relations of any bird.

C. HART MERRIAM.

INTRODUCTION.

Questions relating to the English Sparrow were contained in the first circular on economic ornithology issued by the Department of Agriculture (in July, 1885). Subsequently these questions were amplified, and during the year 1886 a special circular and schedule were prepared, upwards of 5,000 copies of which have been distributed.

It has been the aim of the Department, in collecting information on this question, to get as much direct, original, unpublished evidence as possible, and to this end the circulars sent out asked for "facts from personal observation." It was desired, furthermore, to obtain data from all parts of the country over which the Sparrow had spread, not only in order to map accurately its distribution, but to detect if possible any differences in character or habits which might be due to varied climatic or other conditions. In addition, therefore, to the systematic distribution of circulars of inquiry among the agriculturists and naturalists of the country, requests for information were published in many agricultural and scientific periodicals, as well as in newspapers throughout the country, in the hope that many persons not otherwise reached might become interested in the subject, and be led to detail their own experience. The result has been, in the main, very gratifying, and to date there have been received from all these sources replies from about 3,300 persons, nearly two-thirds of whom report the Sparrow already established in their immediate vicinity, and, with very few exceptions, steadily increasing in numbers.

The remainder of these 3,300 reports, coming principally from postmasters in sections which the Sparrow has not yet reached, have been used mainly in mapping the limits of its distribution.

In addition to the material thus collected, the American Ornithologists' Union has turned over to the Department of Agriculture the results of its investigations, begun in 1883, on the eligibility or ineligibility of the European House Sparrow in America. This material, comprising full replies from about 110 persons, was collated and arranged by Dr. F. H. Hoadley, who, from interest in the subject, kindly volunteered his services.

Naturally, the discussion of this subject in America for several years past has led to the publication, in scientific and other periodicals, of a vast amount of valuable information besides that which has come directly into the possession of the Department of Agriculture; and when to this is added the voluminous and oftentimes valuable publications relating to the status of the Sparrow in other countries, it will be seen that the material available for a satisfactory investigation of the Sparrow problem is very full and measurably complete. The collation and comparison of such data have involved a large amount of care and patience, and in presenting the results of this investigation to the public it is believed that any one so disposed can find in the present report facts enough to set at rest all doubts as to the economic status of this well known species.

At the outset of the investigation the fact was recognized that doubters on either side of the question would not be likely to abandon their positions on the simple presentation of any amount of mere opinion; and it was therefore determined to print in detail all the evidence on which the conclusions were based, so that each reader might see for himself whether the facts had been fairly interpreted, and whether the verdict was just or unjust.

In accordance with this plan, the present Bulletin will be found to consist of two very distinct parts, viz, evidence and deduction, the former far exceeding the latter in volume. Under the head of evidence will be found in its appropriate place every scrap of information relevant to the inquiry, under the name of the person contributing it, and accompanied, whenever possible, by the exact date and locality to which the information relates.*

Most of the information contributed was received in reply to questions contained in circulars of inquiry. Wherever possible these replies have been printed in the same form in which they were received, and when for any reason it has been found necessary to change the form of a reply, either in dismembering a statement relating to several subjects, or in condensing several statements relating to the same subject, the utmost care has been taken to preserve the exact meaning of the observer; while in all cases where the meaning has been obscure, the statements have been given verbatim. Perhaps it might have been better in such cases to omit the statement altogether, but the fact has been kept constantly in mind that all such omissions might be construed by some as evidence of partiality or prejudice.

The deductions from this evidence, which constitute the larger portion of Part I of this Bulletin, are the result of careful study and comparison, and have been made, it is believed, with perfect fairness to all sides of the question. The history of the Sparrow controversy in America shows plainly, however, that it would be folly to expect all friends of the Sparrow to accept our conclusions as to its character and habits. There are some persons whose minds are so constituted that nothing is evidence to them except what is derived from their own observation, and as this unfortunate mental infirmity is commonly correlated with the total inability to observe anything which interferes with their theories, it makes little difference whether their opportunities have been good or bad, their position is unassailable. With this class of observers we have nothing to do. No amount of evidence will change their opinion, and fortunately for the good of mankind it makes little difference what that opinion may be. But the mass of American agriculturists, mechanics, and professional men are reasonable beings, willing to believe the reports of other men whose opportunities for observation have been better than their own, and it is believed that a majority of these men will be glad to examine the large amount of evidence presented, and settle for themselves the question of the Sparrow's character.

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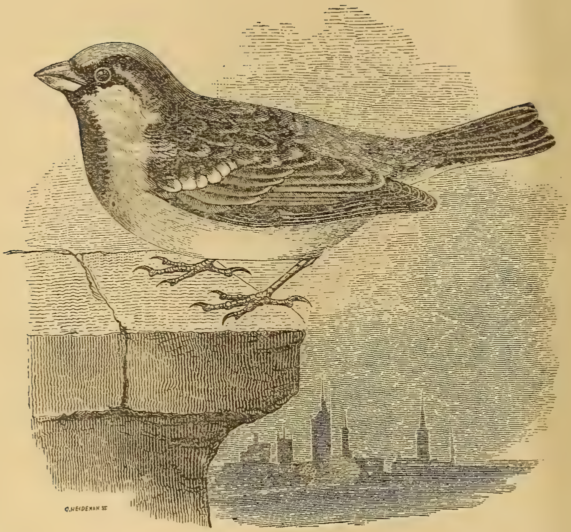
* The amount of testimony thus arranged proved to be so large—more than treble the size of all the remainder of the Bulletin—that when submitted for publication it was found to be absolutely impossible to print it entire, and consequently it has been reduced very greatly. The utmost care has been taken, however, to preserve the impartial character of the evidence as a whole, by retaining both favorable and unfavorable testimony as nearly as possible in the same proportions in which they existed in the report as originally prepared.

For those who have not time to read the evidence in detail summaries of the evidence on each head have been prepared, including tables showing the alleged injuries to each crop, and briefer summaries showing the numbers of favorable and unfavorable reports on each question. No doubt these tables are often misleading, for in them a simple yes or no from a man whose observation has been limited carries the same weight as the mature results of half a life-time of observation by another; yet many facts are brought out strongly which might be overlooked otherwise, and the tendency to give undue weight to numbers alone is partly corrected by the samples of evidence submitted in connection with each summary.

In regard to these "samples of evidence" it should be stated that it has been the endeavor to select those which would give a fair idea of the character of the evidence, not simply those which support any one view of the case. Undoubtedly objection will be made on the one hand to the selection of so few favorable reports, and on the other to the printing of any at all; but the aim has been to give each side of the question a representation proportionate to the weight of evidence, and when any deviation from this rule has been made it generally has been in a direction favorable to the weaker side, that is, to the Sparrow. The selection of many examples of the same kind from any one section of the country has been avoided, as it seemed best in many cases to call attention to the similarity of the reports from widely separated localities.

PART I.

SUMMARIES OF EVIDENCE; RECOMMENDATIONS; SPECIAL REPORTS.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ENGLISH SPARROW, PASSER DOMESTICUS.

From Yarrell.

SECTION FIRST.—SUMMARIES OF EVIDENCE.

IMPORTATION; SPREAD; INCREASE; CHECKS.

INTRODUCTION OF THE SPARROW.

The English Sparrow* was first brought to this country, so far as authentic information has reached the Department, in the fall of 1850, when the Hon. Nicolas Pike and other directors of the Brooklyn Institute imported eight pairs into Brooklyn, N. Y.

As this first importation of Sparrows is of much interest, we give in full Mr. Pike's account of it and of the following importation a year or two later. He says:

"It was not till 1850 that the first eight pairs were brought from England to the Brooklyn Institute, of which I was then a director. We built a large cage for them, and cared for them during the winter months. Early in the spring of 1851 they were liberated, but they did not thrive.

"In 1852 a committee of members of the Institute was chosen for the re-introduction of these birds, of which I was chairman.

"Over $200 was subscribed for expenses. I went to England in 1852, on my way to the consul-generalship of Portugal. On my arrival in Liverpool I gave the order for a large lot of Sparrows and song birds to be purchased at once. They were shipped on board the steam-ship *Europa*, if I am not mistaken, in charge of an officer of the ship. Fifty Sparrows were let loose at the Narrows, according to instructions, and the rest on arrival were placed in the tower of Greenwood Cemetery chapel. They did not do well, so were removed to the house of Mr. John Hooper, one of the committee, who offered to take care of them during the winter.

"In the spring of 1853 they were all let loose in the grounds of Greenwood Cemetery, and a man hired to watch them. They did well and multiplied, and I have original notes taken from time to time of their increase and colonization over our great country."

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*The true name of this bird is the "House Sparrow." The name "English Sparrow" is a misnomer, as the species is not confined to England, but is native to nearly the whole of Europe. The fact that most of the birds brought to America came from England explains the origin of the misleading name by which it is now so widely known that any attempt to change it would be futile.

Col. William Rhodes, of Quebec, Canada, states that in 1854 he introduced English Sparrows at Portland, Me. (Forest and Stream, Vol. VIII, p. 165). Others were introduced there in 1858 by Mr. Thomas Amory Deblois, and about the same time Mr. Jos. Peace Hazard introduced them at Peace Dale, R. I. These last birds came from Liverpool, England, and some escaped in Boston where they were landed. Nothing seems to have been heard of the escaped birds, however, and ten years later they were first regularly introduced into Boston Common. In 1860, twelve birds were turned loose in Madison Square, New York City; in 1864, they were introduced to Central Park, and two years later two hundred were set free in Union Park, New York City. About the same time they were first fully established in the city of Quebec, Canada, although one or two apparently unsuccessful attempts had been made previously.

In 1867 forty pairs were imported at New Haven, Conn , and the same year a colony was established at Galveston, Tex. In 1868 about twenty Sparrows were liberated on Boston Common, followed by more the next year, while at the same time twenty were released in Charlestown, Mass., only a mile or two away. This year (1869) witnessed the importation, in one lot, of a thousand Sparrows by the city government of Philadelphia; and this probably is the largest single importation of Sparrows ever made to this country. The same year twenty pairs were brought from Europe to Cleveland, Ohio, and sixty-six pairs from New York to Cincinnati, Ohio. Within the next two or three years they were introduced at San Francisco, Cal.; in 1873 a colony was imported and liberated at Salt Lake City, Utah; and about two years later they were introduced at Halifax, Nova Scotia, and at various points in Ohio, Michigan, and Wisconsin.

In many of the cases thus far mentioned it is positively known that the Sparrows were brought to this country from the Old World, and mainly, if not entirely, from Great Britain and Germany. But no sooner had they become fairly numerous at any of these points than people began to take them thence to other places, sometimes in large numbers, but more often only a few pairs at a time. In most cases these few birds were carefully watched, protected, and fed, and so multiplied rapidly, forming new colonies from which the birds spread steadily without assistance, and more rapidly by successive transportations by man. This important factor in the rapid increase and wide distribution of the Sparrow in America has been too generally ignored, and it is only within the past year that we have come to realize something of the magnitude of the "craze" which led so many people to foster and distribute this serious pest. None of our circulars relating to the Sparrow asked distinctly for information about its importation or introduction, but only for the date of its first *appearance.* In most cases, therefore, correspondents have simply given the information asked, and only an occasional observer has alluded to the manner of its coming.

Yet from the occasional statements thus made, and from various reliable published records, we have been able to make a list of more than a hundred places in the United States and Canada to which Sparrows have been taken, either by direct importation from the Old World or by transportation from place to place after their arrival in America. From the casual manner in which these data have been obtained it may be considered certain that they represent but a very small fraction of the number of points at which the Sparrow has been introduced; but the early dates of many of the importations, as well as the great distances separating many of the places, are very significant as affording a partial explanation for the unparalleled rapidity with which this bird has overspread the inhabited part of the continent. The following lists explain themselves:

TABLE I.—*Places where English Sparrows have been introduced directly from Europe.*

Place.	Date.	No.
Brooklyn, N. Y.	1851 and 1852	100
Portland, Me	1854 and 1858	
Peace Dale, R. I.	1858	
Boston, Mass	1858, 1868, and 1869	30
New York, N. Y.	1860, 1864, and 1866	220
Rochester, N. Y	Between 1865 and 1869	*100
New Haven, Conn	1867	80
Galveston, Tex	1867	
Charlestown, Mass	1869	20
Cleveland, Ohio	1869	40
Philadelphia, Pa	1869 or earlier	1,000
Salt Lake City, Utah	1873 or 1874	30
Akron, Ohio	1875	
Fort Howard, Wis	1875	
Sheboygan, Wis	1875	6
Iowa City, Iowa	1881	5

* About.

TABLE II.—*Places, not included in Table I, where English Sparrows have been introduced.*

Place.	Date.	Number.	Where obtained.
Alabama:			
Eufaula	1882	4 birds	
Arkansas:			
Hot Springs	Between 1876 and 1880.		
California:			
San Francisco	1871 or 1872		
Stockton	1883		San Francisco.
Colorado:			
Denver	1877	6 pairs (subsequently disappeared).	
Connecticut:			
Norwich	Between 1865 and 1870.		
Portland	1859	5 birds	New York City.
District of Columbia:			
Washington	1870 or earlier		
Georgia:			
Atlanta (country near)	1876		
Macon (country near)	1878		
Rome	1881 or 1882	13 birds	Griffin, Ga.
West Point			Do.
Illinois:			
Belleville	1868	2 pairs	New York City.
Carmi	1876	2 pairs	Evansville, Ind.
Monmouth	Between 1872 and 1874.	About 100 birds	
Quincy	1870	6 pairs	

TABLE II.—*Places, not included in Table I, where English Sparrows have been introduced*—Continued.

Place.	Date.	Number.	Where obtained.
Indiana:			
Evansville	1873		
Indianapolis	1871 and 1872	Several hundred	New York City.
La Fayette	About 1874	2 pairs	
Richmond	1869		Philadelphia, Pa.
Iowa:			
Cedar Rapids	About 1874		Massachusetts.
Davenport	1870	10 pairs	
Dubuque	1876	20 pairs	
Kansas:			
Lawrence	1876 or 1877		
Topeka	1874	5 birds	New York City.
Kentucky:			
Louisville	1865 and 1870		
Louisiana:			
New Orleans	Between 1874 and 1876		
Maine:			
Bangor	1876 or earlier		
Lewiston	1874	12 birds	
Massachusetts:			
Brookline	1868		
Cottage City	About 1882	About 24 birds	
Somerville	1871		Boston (?).
Michigan:			
Jackson	Between 1874 and 1876		
Owosso	1876	4 birds	
Minnesota:			
Saint Paul	1876		
Mississippi:			
West Point	1880	10 or 12 pairs	
Missouri:			
Brookfield	About 1883		Hannibal, Mo.
Hermann	1874	7 pairs	Belleville, Ill.
Mexico	About 1876		
Queen City	1883		New York.
Saint Louis	1869	A few pairs	New York City.
Nebraska:			
Nebraska City			Philadelphia, Pa.
New Jersey:			
Tuckerton	About 1873		
New York:			
Poughkeepsie	About 1864		
North Carolina:			
Goldsborough	1879 or 1880		
Wilson	1876 or 1877	About 50 birds	
Ohio:			
Cincinnati	1869	66 pairs	
Coshocton	1874	13 birds	Washington, D. C.
Marietta	About 1870		New York City.
Portsmouth	1874	2 pairs	
Steubenville	1880 or 1881		
Wapakoneta	About 1882		
Warren	1869	Several pairs	New York City.
Pennsylvania:			
Erie	Between 1871 and 1874	102 birds	Philadelphia, Pa.
Germantown	1873 or earlier		
Milford	About 1874		New York City.
Pennsylvania:			
Shippensburgh	About 1868	1 pair	Philadelphia, Pa.
Titusville	About 1871	5 pairs	
Washington	1874	12 birds	Philadelphia, Pa.
Waynesburgh	About 1871		Do.
West Chester	About 1875	6 birds	Do.
Rhode Island:			
Newport	1874	8 birds	Boston, Mass.
Providence	1866 or earlier	8 birds	New York City.
South Carolina:			
Chester C. H.	1872 or 1873		
Columbia	1869 or 1870	A few pairs	
Tennessee:			
Knoxville	1874	4 pairs	New York City.
Memphis	1871	3 pairs	
Vermont:			
Saint Johnsbury	Between 1874 and 1876		
Virginia:			
Culpeper	1873 or 1874		Washington, D. C.
Fredericksburgh	About 1878	5 young	Richmond, Va.
Lynchburgh	About 1876		Do.
Norfolk	Between 1871 and 1874		
Richmond	1872		New York City.

TABLE II.—*Places, not included in Table I, where English Sparrows have been introduced* —Continued.

Place.	Date.	Number.	Where obtained.
Virginia:			
Salem	1870 or 1871		Richmond, Va (?)
Suffolk	1874		
Warrenton	Between 1876 and 1878		
Wytheville	1875 or 1876		Richmond, Va.
Wisconsin:			
Fox Lake	1881 or 1882	5 or 6 birds	Milwaukee, Wis.
Hartford	1876		Do.
Madison	1873	About 20 pairs	New York City.
Milwaukee	About 1871		
Sauk City	Between 1876 and 1878	1 pair	
Stevens Point	1874	6 birds	Detroit, Mich.
Wausau	1880		Milwaukee, Wis.
Canada:			
Halifax, N. S	1875 or 1876		
Hamilton, Ont	About 1872		
Oshawa, Ont	About 1876		
Ottawa, Ont	About 1870	10 pairs	
Strathroy, Ont	1874	6 pairs	New York City.
Toronto, Ont	About 1875		
Montreal, Q	1870		
Quebec, Q	1864		

TABLE III.—*Places where English Sparrows are said to have appeared as early as* 1870, *and where they may have been introduced, although not so reported.*

Place.	Date.
Connecticut:	
Manchester	1869–1872.
Meriden	1870.
Middletown	1870.
Georgia:	
Albany	1867.
Macon	1865–1870.
Illinois:	
O'Fallon Depot	1869–1870.
Pekin	About 1870.
Indiana:	
Burlington	1870 or before.
Irvington	1870.
Marengo	1863. [?]
New Albany	1865–1870.
Iowa:	
Burlington	1869–1870.
Kentucky:	
Bloomfield	1868–1869.
Lexington	1868–1871.
Maryland:	
Cumberland	1868.
Hancock	About 1865.
Williamsport	1870.
Massachusetts:	
Holyoke	1870 or earlier.
Medford	1869–1872.
Springfield	1866.
New Jersey:	
Bridgeton	1868.
New Jersey—Continued.	
Caldwell	1870.
Chatham	About 1868.
Hackensack	About 1870.
New Providence	1866 or earlier.
Trenton	1870.
New York:	
Dobbs Ferry	1866.
Fredonia	About 1870.
Oswego	1870–1872.
Sing Sing	1866.
Syracuse	1863–1864.
Utica	1861.
Ohio:	
Dayton	1867.
Hamilton	About 1868.
Pennsylvania:	
Lancaster	1870 or earlier.
Middleburgh	1868 or 1869.
Pottstown	About 1870.
Wrightsville	1867 or 1868.
Virginia:	
Staunton	1870 or 1871.
Waterford	1870 or 1871.
West Virginia:	
Shepherdstown	1866.
Wisconsin:	
Berlin	About 1870.
De Pere	Do.

A study of these tables shows that even before 1875 there were many large Sparrow colonies throughout the United States, east of the Mississippi, as well as several in Canada, one or more in Utah, one at Galveston, Tex., and probably another in San Francisco, Cal. There were small colonies also in eastern Iowa and in Missouri, Kansas, and Nebraska.

From this time to the present, the marvelous rapidity of the Sparrow's multiplication, the surpassing swiftness of its extension, and the prodigious size of the area it has overspread are without parallel in the history of any bird. Like a noxious weed transplanted to a fertile soil, it has taken root and become disseminated over half a continent before the significance of its presence has come to be understood. The explanation of this phenomenal invasion must be found in part in the direct assistance given by man in carrying it from place to place intentionally; in part in the peculiar impetus usually given prolific species when carried to a new country where the conditions for existence are in every way favorable; and in part in its exceptional adaptability to a diversity of physical and climatic conditions. This adaptability has enabled it not only to endure alike the tropical heat of Australia and the frigid winter of Canada, but to thrive and become a burdensome pest in both of these widely separated lands.

At first sight it seems difficult to understand why man should have taken so much interest in this bird, and aided in its rapid increase and spread; but the consideration of a few points bearing upon the matter will render the case more intelligible.

A considerable part of our population, and especially that of the newer parts of the country, consisted of Europeans who naturally remembered with pleasure many of the surroundings of their former homes and doubtless often longed for the familiar chirp of the Sparrow. They had no strong associations connected with our American birds, and our treeless cities and uncultivated prairies contrasted strongly with the thickly settled country—half garden, half city—which so many of them had left. So, as opportunity offered, small lots of Sparrows and other European birds were brought to this country; or after the Sparrows became abundant in our Eastern cities they were carried inland to a large number of different places. There is little doubt that if we could obtain the data relating to the introduction of Sparrows at all points where they are now found in the Mississippi Valley, we should find that by far the larger part of these introductions had been accomplished by English, German, and French citizens, inspired by the recollections of the birds of their fatherland.

In addition, the prevailing ignorance of the average American citizen with regard to our native birds, joined to the totally erroneous, or at least grossly exaggerated, reports of the benefits conferred by the Sparrows in New York, Philadelphia, and other Eastern cities, tended to increase the interest which naturally attached to an imported bird, until many persons went to the expense of purchasing and shipping Sparrows to considerable distances in the belief that they were insectivorous birds and must prove beneficial wherever they could be naturalized. In this way a veritable Sparrow "boom" was started, and the price of Sparrows in New York went up to such a point that many people desirous of obtaining the birds found it cheaper to club together and import them direct from Europe; while in many cases this was doubtless done from the desire to obtain birds from the neighborhood of the im-porter's native place, or through distrust of the kind of Sparrow already imported, which, unfortunately, was widely known from the first as the English Sparrow. We can never know how many separate importations were thus made, nor how many thousands of individuals were introduced, but it is certain that the number of places thus supplied with birds is much greater than has been supposed, and considering this fact and the rapid rate at which the Sparrow breeds, we ought not to wonder that it has so completely overrun the country.

METHOD OF DIFFUSION OF THE SPARROW.

In the ninth edition of the Encyclopedia Britannica the distinguished ornithologist, Prof. Alfred Newton, makes the following statement:

> The House Sparrow is far too well known to need any description of its appearance or habits, being found, whether in country or town, more attached to human dwellings than any other wild bird; nay, more than that, one may safely assert that it is not known to thrive anywhere far away from the habitations or works of men, extending its range in such countries as Northern Scandinavia and many parts of the Russian Empire as new settlements are formed and land brought under cultivation.
>
> Thus questions arise as to whether it should not be considered a parasite throughout the greater portion of the area it now occupies, and as to what may have been its native country. Moreover, of late years it has been inconsiderately introduced to several of the large towns of North America and to many of the British colonies, in nearly all of which, as had been foreseen by ornithologists, it has multiplied to excess, and has become an intolerable nuisance, being unrestrained by the natural checks which partly restrict its increase in Europe and Asia.

This statement of the Sparrow's relations to man is unquestionably true wherever the bird is known, and hence in America we should not expect to find it except in settled portions of the country. The manner, however, in which it overruns a new country to which it is introduced differs somewhat from the way in which it extends its range in older countries as the area of cultivation is extended. In America, the method by which the Sparrows spread without the direct aid of man is peculiar. They first invade the larger cities, then the smaller cities and towns, then the villages and hamlets, and finally the populous farming districts.

> As the towns and villages become filled to repletion the overflow moves off into the country, and the Sparrow's range is thus gradually extended. Occasionally, however, it is suddenly transported to considerable distances by going to roost in empty box-cars and traveling hundreds of miles. When let out again it is quite as much at home as in its native town. In this way it reached St. John, New Brunswick, in 1883, on board the railroad trains from the west. In like manner another colony arrived March 1, 1884, in grain cars from Montreal. Similarly it has appeared at a number of towns in the United States. (Hoadley MS.)

The cities and towns first invaded by the Sparrow (of course excluding those where they are actually carried by men) are in most cases railroad towns; and especially in the West there is no doubt that the great railways along which vast quantities of grain are transported have been so many great highways along which the Sparrows have traveled slowly from place to place. More or less scattered grain is always to be found along these railways, and the Sparrows naturally follow wherever food is found. To a lesser degree carriage roads have served the same purpose, the food furnished in the latter case being mainly the partially digested grain in horse droppings.

This gradual spread may take place at any season of the year, but probably is most pronounced in late summer and autumn, for reasons which will at once appear. It has been repeatedly remarked that when Sparrows are first introduced to a new region it is impossible, without actual confinement, to keep them on a farm near a town or city. They soon abandon the country for the city, and, except at harvest time, seldom return to the farm where they were introduced *until the city becomes crowded.* This may mean until there is no longer an ample supply of food for all the Sparrows, or, more commonly, it means until there are no longer enough convenient breeding places for all. In most cases it is the young which are thus crowded out, and consequently in midsummer and early autumn flocks of young birds may be met with far out in the country, wherever food is abundant, and when this food fails, or the ground becomes covered with snow, they retreat to the nearest towns, villages, or even farm-houses, often at considerable distances from the places where they were reared. But, in most cities, a time arrives at last when more Sparrows collect in winter than can possibly find nesting places in spring. Then, when all desirable places have been occupied, the remaining birds are forced to go to other towns or villages, or to nest in the country.

In this way the country for miles about large cities becomes fairly crowded with Sparrows, if the food conditions are favorable, and then the Sparrow shows his great power of adaptation by constructing nests for himself in trees. Twenty years ago there were few places in this country where any such Sparrow nests could be found, but to-day they are common almost everywhere, and frequently they are used as places of shelter and retreat in severe winter weather, as well as for breeding places in summer. At first, evergreen trees are preferred, and a bulky nest, hardly more than a large, irregular heap of straw and rubbish, is built; but as such trees become crowded, or as the Sparrows gain skill in building, other trees are used, and often the nests are smaller and more symmetrical. The nests of native birds also are often utilized as foundations, the rightful owners being driven off first. In places where Sparrows find abundance of food and congenial surroundings, they increase to such an extent that these nests seriously disfigure the shade trees, and by their filth even injure them. Mr. Ridgway, of the Smithsonian Institution, says:

> The English Sparrow has been in Wheatland, Ind., since 1877, and is now very abundant. I recently counted twenty-one of its large nests on one oak tree by the roadside, a little distance outside of the village. (Washington, D. C., February 11, 1888.)

It may seem superfluous to many readers to introduce any evidence showing that the Sparrow is not confined to cities, but so many persons who ought to be well informed in such matters have made careless or inaccurate statements in this connection, that a few words may not be out of place here.

It is true, as has been shown already, that Sparrows *prefer* towns or cities so long as their numbers are not excessive and food is abundant there; but it is equally true that where the conditions are favorable they eventually spread over the country as well as the towns, not only going out from the city to the wheat-fields in flocks, but taking up their residence at farm-houses, many miles from any large town, and remaining there throughout the year. The time which must necessarily elapse between the first appearance of Sparrows in a town and their occupation of the surrounding country will vary very much according to circumstances, and doubtless there are places in which, owing to certain peculiar conditions, such a state of affairs never will be reached, but, nevertheless, *as a rule*, such a result is only a matter of time.

Mr. F. W. Giles, who first introduced the Sparrows in Kansas, in 1874, writes from Topeka, under date of October 6, 1886:

> They do not go out into the country at all, but have gone to various towns, distant 20 to 100 miles from Topeka.

And Mr. Byron J. Peckham wrote from Westerly, R. I, early in 1884:

> They do not extend their visits to farms and their produce, but prefer the cities and villages.

Doubtless these statements are the results of actual observation in the localities named; but the observations do not cover a sufficiently long period to justify any general conclusions of the same kind, or even to make it probable that the Sparrows will continue to be so restricted in those cities. For it is a matter of every day observation, in a multitude of localities, that the Sparrows sooner or later overflow the cities and towns, and spread over the surrounding country. From personal observation in the neighborhood of New York, Washington, and other cities, as well as in the country about small towns, we are able to state that Sparrows are abundant along the country roads for several miles beyond the suburbs. That the same thing is true in various parts of the country appears from the following testimonials.

Mr. H. J. Gaylord, of Binghamton, N. Y., writes:

> He is no longer a city resident, but is finding his way to the small villages, and already is at the farmer's houses eight and nine miles in the country. He builds not only in crevices and holes he finds around buildings, but in evergreen trees and running vines, on trellises; and he adapts himself to whatever condition he finds.

Mr. Witmer Stone, of Germantown, Pa., writes:

> The Sparrow is now found throughout the villages, and about all the farm-houses in Chester and Lancaster Counties. It appeared in the villages of Lancaster County some years before it was common in Chester County, but it has now been common at the farm-houses in the central parts of the latter county for three or four years. I find it has also made its appearance at all the villages and farm-houses situated along the Susquehanna River in Lancaster and York Counties, but as yet it is not abundant there. (November 9, 1886.)

Dr. W. S. Strode, of Bernadotte, Fulton County, Ill., writes:

In the spring of 1885 I first noticed four or five pairs in our little town, making the eaves of the flouring mill their headquarters, and here they brooded. By the next winter their number had increased to a score or more, and they staid with us. The next season they had become numerous, nesting wherever they could find a suitable place in barns and houses, no one molesting them or paying much attention to them. This season by their increasing numbers they demanded attention and commenced spreading out into the country to find nesting places. (September 7, 1887.)

From L. N. Bonham, Oxford, Butler County, Ohio:

Farm one mile from village. The Sparrows are very abundant here, and are spreading from farm to farm in every direction. They appeared in the village about eight years ago. (November 29, 1886.)

From S. R. Ross, Portsmouth, Scioto County, Ohio:

The city is overrun with Sparrows, and they are also finding their way to the adjoining farms and villages. (September 2, 1886. Present about twelve years.)

From S. C. Prout, Prout, Erie County, Ohio:

They are here in large flocks on each farm, whether large or small. (January 7, 1887. Present about ten years.)

From William H. Elgar, Platteville, Grant County, Wis.:

There are as many here in the city now as ever, but it has extended into the country more. (November 23, 1886. Present about five years.)

RATE OF SPREAD OF THE SPARROW, AND EXTENT OF AREA OCCUPIED AT THE CLOSE OF THE YEAR 1886.

In the year 1886 the English Sparrow was found to have established itself in thirty-five States and five Territories. Of these it occupies the whole or large parts of the following thirty-three States and two Territories: Alabama, Arkansas, California, Connecticut, Delaware, District of Columbia, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Utah, Vermont, Virginia, West Virginia, and Wisconsin, and is found in a few towns in Florida, Texas, Wyoming, Idaho, and Arizona. Small, isolated colonies may exist in a few other Territories, but if so they have escaped the searching inquiry of the Department. In the United States the total area occupied at the close of the year 1886 is 885,000 square miles; in Canada it is not quite 148,000 square miles; in all, 1,033,000 square miles.*

Some idea of the alarming rapidity with which it is at the present moment multiplying and extending its range may be had from the fact that in the United States alone it has spread during the past fifteen years at the average rate of 59,000 square miles per year, and in the United States and Canada together at the rate of 69,000 square miles per year. But this *average* rate manifestly is misleading, so far as both extremes are concerned, for species increase in geometrical ratio. The rate for some time after 1870 was comparatively slow, while during the present decade it has progressed with astonishing rapidity, till in the year 1886 the new territory invaded must have reached the enormous number of 516,500 square miles, as may be seen from the following:

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*The data on which the computation of the Canadian area is based are insufficient, consequently the size of the area here given must be regarded as approximate only. The United States area, however, may be looked upon as very nearly exact.

Table showing approximately the extension in square miles of the English Sparrow, in periods of five years each, from 1870 *till* 1885, *and its extension during the year* 1886.

	Square miles.
From 1870 to 1875 it spread over	500
From 1875 to 1880 it spread over	15,640
From 1880 to 1885 it spread over	500,760
In the year 1886 it spread over	516,500

This table of necessity is largely theoretical, though the ratio of increase must be very nearly correct. Year by year much of the reproductive energy of the Sparrow is expended in filling up the smaller towns and villages of the area which, so far as the larger towns and cities are concerned, it covered some time previously.

RATE OF INCREASE OF THE SPARROW.

In asking for information as to the number of broods and young annually reared by the Sparrow, we hoped to receive many statements of fact, but our expectations have been hardly realized, as most of the replies seem to be mere guesses, not based on actual observation.

The fact that more or less nest-building goes on during every month of the year has led many people to suppose that the Sparrow breeds continuously, but such is not the case, at least in temperate climates. Enough material bearing on this point has been collected to show that Sparrows rarely or never raise more than six broods in a year, and the great majority probably do not raise more than four, at least in the latitude of New York.

In Washington the first young out of the nests may be seen in April, but they are not abundant before the first week in May or after the last week in August, though doubtless a few leave the nest in September, or still more rarely in October.

It is possible that a few eggs may be laid even in December and January, but it is extremely improbable that any young are reared at that time. In the latter part of February, in some years, many Sparrows begin laying, and occasionally a young brood may leave the nest late in March, but such cases must be considered exceptional.

Moreover, although nesting-boxes may be steadily occupied by Sparrows with their young or eggs from the first of April to the first of September, it does not follow that such boxes are tenanted all this time by the same parent Sparrows, or that one brood follows another without any interval. On an average, about four weeks elapse from the laying of the first eggs to the time when the young brood leaves the nest. The number of eggs in a set varies from four to seven, but is usually either five or six, and these ordinarily would be deposited in one week. Twelve or thirteen days are required to hatch them, and the young are fed in the nest for about a week, and then for several days (sometimes as many as ten) after leaving it. More eggs may be laid in the same nest as soon as the young leave it, and in this way it is *possible* for a pair of Sparrows to rear one brood each month for five or six months, but it seems probable that generally the broods do not follow each other quite so rapidly.

It has been claimed that Sparrows which are hatched in the early spring often pair and rear young during the ensuing summer or autumn, but although several of our correspondents state this to be the case, we have not received sufficient evidence to justify us in supporting these views. Another theory which would account in part for the rapid increase of Sparrows is advanced in the following communications:

Dr. W. H. Bergtold, of Buffalo, N. Y., writes:

> As regards the number of broods and young reared by a pair of Sparrows in a year, I wish to make a statement and put forth a theory that I have never seen advanced before. I have repeatedly examined nests of this bird containing nearly full-fledged young, two or three young in more or less advanced stages of development, and several eggs of various degrees of incubation, some being nearly fresh, while others were about to break through. I gather from these facts that the Sparrow, at least in some cases, lays and continues to lay a succession of eggs so long as the weather is not too cold; and as the young attain a sufficient amount of strength they are expelled from the nest. Assuming such to be the case we can easily see how much of the incubation work is taken from the parents and thrown on the young, who, by their bodily heat and proximity, readily take up such duties (quite unintentionally, I imagine), and also how much work can be given to the proper maintenance of a generous food supply for both the old and young.
>
> This constant stream of outpouring Sparrows accounts for the rapid manner in which this species multiplies. (August 21, 1886.)

J. B. Stockton, of Toronto, Kans., writes:

> The Sparrow had a nest under the eaves, and all summer there seemed to be fresh or newly-hatched birds in the nest. There were eggs in the nest all the time, and the warmth of the unfledged young hatched the eggs, so that there was a continuous and uninterrupted stream of full-fledged birds coming from that same nest all the season, and unfledged ones of various degrees at the same time remaining in the nest. I have never known or noticed anything of the kind with any other bird. (October 6, 1886.)

Although such cases as the foregoing may occur with more or less frequency, they certainly are not the rule, as it is certain that in most cases all the eggs are laid before any are hatched, and all the young leave the nest at about the same time.

Moreover, it is not necessary to resort to such a theory to account for the rapidity with which the Sparrow increases. It is a hardy, prolific, and aggressive bird, possessed of much intelligence and more than ordinary cunning. It is domestic and gregarious in habit and takes advantage of the protection afforded by proximity to man, thus escaping nearly all the enemies which check the increase of our native birds. Moreover, for many years it was looked upon with favor, and both food and shelter were provided for it.

Its fecundity is amazing, and from the testimony submitted it is evident that it is no unusual thing for a single pair, in the latitude of New York, or further south, to rear twenty or thirty young in the course of a year. Assuming the annual product of a pair to be twenty-four young, of which half are females and half males, and assuming further, for the sake of computation, that all live, together with their offspring, it will be seen that in ten years the progeny of a single pair would be 275,716,983,698. This will appear in detail from the following table:

Annual increase and total number of English Sparrows, the progeny of a single pair, in successive seasons for ten years, assuming that all lived.

Years.	Number of pairs breeding.	Number of pairs of young.	Total number of pairs.	Total number of birds.
First	1	12	13	26
Second	13	156	169	338
Third	169	2, 028	2, 197	4, 394
Fourth	2, 197	26, 364	28, 561	57, 122
Fifth	28, 561	342, 732	371, 293	742, 586
Sixth	371, 293	4, 455, 516	4, 826, 809	9, 653, 618
Seventh	4, 826, 809	57, 921, 708	62, 748, 517	125, 497, 034
Eighth	62, 748, 517	754, 932, 204	815, 730, 721	1, 631, 461, 442
Ninth	815, 730, 721	9, 788, 768, 652	10, 604, 499, 373	21, 208, 998, 746
Tenth	10, 604, 499, 373	127, 253, 992, 476	137, 858, 491, 849	275, 716, 983, 698

Of course, the actual increase of the Sparrow is but a small fraction of the total shown in this table, which is based on assumptions, some of which at least are not likely ever to be realized. But if we reduce the annual number of young per pair to twelve, still assuming that half are males and half females, and allow that all live even five years, we shall have as the total increase of one pair in that time 33,614 birds. In some cases it would seem as if these figures had actually been reached, so rapid has been the increase at certain places, but it is probable that in almost all cases the original stock in any town consists of several pairs, and these are usually increased from time to time by accessions from neighboring cities. It seems probable that the large colonies at Galveston, Tex., Salt Lake City, Utah, and San Francisco, Cal., have resulted wholly or in very large part from the few pairs originally introduced at those places, but it is impossible to say this of most other centers of abundance.

The following examples of evidence will serve to give a slight idea of the rapidity with which the Sparrow increases.

From Norwood Giles, of Wilmington, N. C.:

> They rear four broods here. They began nesting as early as January 22 this year. (November 13, 1886.)

From H. B. Bailey, of East Orange, N. J.:

> It rears five or six broods yearly, with four to six young in a brood. (February 7, 1884.)

From Thomas Chalmers, of Holyoke, Mass.:

> It usually rears five broods annually, and five birds to a brood. I have known of six broods in a season from one pair of birds. Its fecundity is astonishing; the number of eggs that can be taken from a mature female is something incredible. (March 6, 1884.)

From William F. Lamb, of Holyoke, Mass.:

A pair which have bred in a box near my window for seven successive years, have reared three broods each year, averaging five young to a brood. (February 29, 1884.)

From Clarence L. Cate, of Spencer, Mass.:

I know of one pair that raised six broods in 1884, and I believe that four or five is the number of broods regularly raised by a pair. (October, 1886.)

From Elisha Slade, of Somerset, Mass.:

Five broods are usually reared in a season, and the number of young in a brood varies from five to eight; the average is six or more. A single pair become the parents of thirty or more young in one season. They often have their first brood late in March or early in April, and nestlings are common in September and October, and in every intervening month. Young birds hatched in April frequently pair and rear a brood in early autumn. (August 20, 1886.)

From John F. T. Edwards, of Ironton, Mo.:

The three or four birds which were here about two years ago have multiplied into one or two hundred. (November 15, 1886.)

From J. M. Fowlkes, of Memphis, Tenn.:

In the fall of 1871 three pairs of Sparrows were introduced here by Col. C. J. Selden, and judging from the present crop they have thriven well. No other importation of these birds has been made, but the progeny of this stock now infest the city and the suburbs for several miles. (November 13, 1886.)

From W. T. Sledge, of Lawrenceville, Va.:

Seven were first seen here (in 1876), but since that time they have miraculously increased. Two Sparrows have been known to hatch twenty-four young in one nest during the summer. (November 12, 1886.)

From Walter B. Hull, of Milwaukee, Wis.:

I have killed nearly five hundred, old and young, since January. I killed ten broods the first sitting, and more than twenty the second, but even now they are hatching. The 21st of this month I killed four broods aggregating fourteen young. (August 23, 1886.)

The following account of the introduction, increase, and spread of the English Sparrow in the neighborhood of Strathroy, Ontario, Canada, is furnished us by Mr. L. H. Smith, of that place. He writes:

In March, 1874, I sent to a New York bird dealer, and he forwarded me per express, twelve birds, six males and six females, at a cost to me of $1 each. If all the Sparrows in our town are mine, and my neighbors all say they are, then I have at least plenty for my money. The six pairs of Sparrows I turned out in some farm buildings near town, where they stayed for a week or two. By and by, by ones and twos, they moved to town, and, singular to say, one pair built a nest in the cornice of the house of the man who wrote me in England, in 1873, to bring some out, and another pair built in the next house to my own. They are now in thousands in our town, and are plentiful in every town, city, and village in this part of Ontario. I do not think they all came from the six pairs of birds which I brought here in March, 1874, because I remember in the summer of 1873 seeing them as far west as Syracuse, and they might have been farther this way.

Strathroy is 20 miles west of London, and 40 miles east of Port Huron, Mich.

It was only a few years after 1874 I noticed them at Toronto and London and other places east of this. It is perhaps eight years since they spread west of this. I have no proof that all did not come from my six pairs. For several years they increased very slowly and gradually here, only one small colony the first year, two or three the next, and so on, till in a few years almost all suitable premises had colonies of them. There are none yet, so far as I know, in far northern and western Ontario. No special protection was given them in our town, save that the general feeling amongst our citizens was to protect them, and they were not molested. (October 11, 1886.)

CHECKS ON THE INCREASE OF THE SPARROW.

The checks which have operated in the past to limit the increase and spread of the Sparrow may be roughly classed under two heads, (*a*) natural, (*b*) artificial; including under the latter head all those hostile influences due solely to man, and under the former all others. Among the natural checks may be mentioned climate, food, natural enemies (such as cats, hawks, jays, etc.), and disease.

It is a general rule in the animal kingdom that excessive multiplication tends to disease, and nearly all animals are subject to epidemics and parasites which tend to reduce their numbers when they become extremely abundant. But nothing of this kind is known among Sparrows, and they seem to be among the hardiest and healthiest of birds. It is true that albinism is quite common, specimens which are more or less white being frequently seen on the streets of most large towns, but this can hardly be considered an indication of weakness or disease in the species, although it probably does result from living under more or less unnatural conditions.

NATURAL ENEMIES OF THE SPARROW.

As regards natural enemies the Sparrow is remarkably favored, for, from its constant association with man, it escapes nearly all the perils which restrict the increase of native birds.

It is generally supposed that cats must catch many Sparrows, but in point of fact it is rare for an adult Sparrow to fall into the clutches of this enemy, and even the young are not often caught. The centuries of experience which have developed this bird into a parasite upon man have taught it how to avoid the other semi-domesticated animals surrounding him, and it is safe to say that çats have far better success in catching the wariest of our native birds than in catching the Sparrow.

A few of our native birds kill Sparrows or eat their eggs and young, but the number of species is very limited, and, except in rare cases, the number destroyed is insignificant.

Probably the most useful bird in this respect is the northern shrike (*Lanius borealis*), which visits most of our Northern cities in winter and feeds freely on the Sparrow. At one time this shrike became so abundant on the common and public gardens in Boston that it threatened to destroy all the Sparrows, but the short-sighted authorities kept a man busy in shooting the shrikes until several dozen had been killed, and the useless Sparrows were considered safe.

In many cities and towns of the Mississippi valley the bluejay (*Cyanocitta cristata*) is said to lessen the number of Sparrows somewhat by eating their eggs and young, but in most of the Eastern States this bird is rarely seen in towns and villages in summer, and so has little effect on the Sparrow.

The crow-blackbird or purple grackle (*Quiscalus quiscula*) also kills some Sparrows. Mr. Robert Ridgway states that he once saw it engaged in eating the young on the Smithsonian grounds; and Mr. William Brewster, of Cambridge, Mass., states that in one case he saw a grackle follow and kill a Sparrow which had been slightly wounded, and it at once began to eat its victim. Mr. Brewster also states that in Cambridge the grackles have steadily increased in numbers, while the Sparrows at present do not seem to be increasing at all; and he suggests that the two facts may be correlated in some way.

The sparrow-hawk (*Falco sparverius*) and the screech owl (*Megascops asio*) prey upon Sparrows, and their presence in our parks and about our houses should be encouraged so long as the Sparrows are abundant. Both these birds eat large numbers of insects, and rarely attack native birds. Several other predatory birds, such as the sharp-shinned and Cooper's hawks (*Accipiter velox* and *cooperi*) and the pigeon-hawk (*Falco columbarius*), sometimes feed largely on the Sparrow; but, as they also destroy many native birds, their protection can not be advised, except under peculiar conditions.

THE RELATION OF CLIMATE AND FOOD TO THE INCREASE AND SPREAD OF THE SPARROW.

Sparrows thrive at Montreal, Canada, and at Galveston, Tex., but it is nevertheless true that they do not increase as rapidly or as steadily in cold climates as in temperate ones. Scores of observers testify to the fact that Sparrows die in large numbers during very severe winters, and this mortality is usually attributed to cold. This, however, is a mistake, for a healthy, well-fed Sparrow can resist, without serious inconvenience, the lowest temperatures ever experienced in the United States.

Sparrows are "winter killed" usually because their customary food is covered by snow, or frozen hard, and they are thus starved to death rather than frozen. This is proved by the fact that small numbers of Sparrows, which have been regularly fed, but not otherwise cared for, have repeatedly survived the severe winters of Minnesota, while hundreds of Sparrows have died in places which were much warmer, because they were not fed by man and could not get enough food by their own efforts. No doubt Sparrows thrive best in temperate climates, where the ground is seldom covered by snow for any length of time; yet, if provided with a good supply of food, they may survive long periods of deep snow and low temperature.

It will be shown later that the principal source of food supply for city Sparrows is the droppings of grain-fed horses, and this supply is usually as abundant and accessible in winter as in summer. It will be seen at once, however, that with a temperature many degrees below zero this offal is frozen so quickly and thoroughly as to cut off almost completely the Sparrows' main reliance.*

Sparrows were introduced at Saint Paul, Minn., as early as the fall of 1876; yet at the present time there are so few that they are seldom noticed. The following statement by an observant resident of that place, Mr. Morton Barrows, shows at least one cause, and that undoubtedly the principal one, for this state of things. He says:

> Our streets are not cleaned in winter, sleds being used universally. Moreover, we have no thaws, and everything remains frozen solid until spring. At 30 degrees below zero horse droppings freeze almost instantly, and are generally covered with the loose, fine snow of the streets as they fall, that is, it is so cold that there is always a fine, loose surface snow, from 1 to 5 inches deep, even in the most used streets, and anything falling into that is quickly buried by passing teams.
>
> Not much grain is moved here in any weather, especially not in winter. The ground is generally covered deep with snow from the middle of November until April, and I do not see what Sparrows can find to feed on. Again, we have more or less deposit each day, even in clear weather. When it is intensely cold spiculæ fall in large quantities, generally in the morning, while snow-storms are very frequent. All manner of refuse is thus quickly covered.

The same check on the increase of the Sparrow has doubtless been felt in many other Northern cities, and it is possible that this alone will suffice to render the bird harmless near the northern limit of its range. At first sight it may seem that the abundance of Sparrows in some Canadian cities would be fatal to this theory; but we must remember that the climate of Minnesota is much more severe than that of Ontario, and also that Sparrows were originally introduced at many points in Canada; that they have been there much longer than in Minnesota; and, finally, that they have been cared for much more generally in Canadian towns than in those of Minnesota.

There is abundant evidence that Sparrows are killed sometimes in large numbers in summer as well as in winter. Severe thunder-storms, with or without hail, but accompanied by high wind, have proved veritable catastrophes to many Sparrow communities, especially where the storms come on at night or after the Sparrows have assembled in large numbers at their roosting places. The details of such Sparrow calamities, which occurred at Rockford, Ill., Baltimore, Md., Jersey City, N. J., and Washington, D. C., will be found in the evidence on this subject, and we have records of similar cases at Rochester, N. Y., and Media, Pa. In some instances thousands of Sparrows have been killed at a single locality by a single storm, the deaths resulting apparently from a thorough drenching, followed by chill, and in some cases doubtless hastened by exhaustion.

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*The great "blizzard" of March, 1888, doubtless killed vast numbers of Sparrows throughout the area in which it was most severe. In New York and Pennsylvania not only were hundreds found dead as the snow melted away, but their scarcity during the spring months was generally remarked. Although this storm was accompanied, or followed, by severe cold in many places, it was more remarkable for very heavy snow-falls and high winds; moreover, it lasted two or three days, and in many places all out-door traffic was suspended for several more. Thus, doubtless, numberless Sparrows survived the violence of the storm only to find all ordinary sources of food supply cut off, leaving them to die of starvation.

Although, as already seen, climate may play an important part in aiding or preventing the increase and spread of the Sparrow, it is certain that the abundance or scarcity of food is even more important. Wherever Sparrows have been introduced by man they have been fed and housed to a certain extent, at all events at first. But soon they have been left to shift for themselves, which is usually the case when they spread unaided from town to town. Grain-eaters by nature and by preference, we have seen how they follow railroads and carriage roads from place to place, living by the way on good or refuse grain, and always tarrying longest in places where such food is most abundant. At harvest time they go out by day into the wheat fields near town, often coming back at night to roost; and when the grain fields are cleared or when snow covers them the Sparrows turn to the city streets with the certainty that a large amount of their favorite food will be found there. Wherever in civilized countries horses are used, more or less grain is necessary to keep them in working order. It may be wheat, rye, oats, barley, or corn, and they may eat much or little, crushed or whole, yet a certain proportion always remains more or less undigested, and much of this eventually becomes accessible to the Sparrows.

The most casual observer can not have failed to notice the eagerness with which the bird appropriates such food, and there is no reason to doubt that this food, more than all other attractions combined, has made the Sparrow what he is—primarily a bird of the street. Under ordinary circumstances this partly digested grain from horse-droppings doubtless forms at least 90 per cent. of the town Sparrow's food, and is not only an abundant and excellent food for the adults, but by virtue of its partial digestion is most admirably fitted for the first food of the young.

The practical bearing of this important fact is obvious: Sparrows introduced to any town at once find themselves provided with an abundance of nutritious food such as they have always preferred. The nooks and crannies about buildings furnish all necessary shelter and the best possible nesting places; proximity to man insures partial protection from the ordinary bird enemies; and so for a dozen generations their increase is rapid and steady.

As they increase in numbers the first check is likely to come from an insufficient number of good nesting places, and in case this want is met, the supply of food may at last become inadequate. Then follows a natural and gradual extension into the surrounding country, or along the roads to neighboring towns and cities. If these towns belong to grain-growing districts the increase may continue indefinitely, or until public apprehension is excited and measures are taken to suppress the threatened scourge. If the grain fails, or some other food becomes superabundant, the Sparrows readily adapt themselves to circumstances, and, as they are always tasting of everything eatable, they frequently acquire a strong liking for some particular fruit or vegetable previously unnoticed. There is scarcely a vegetable product grown by farmer or gardener which the Sparrow can not eat, and there are very many to which it is disastrously partial. Even the most superficial examination of the evidence printed in this volume will satisfy any candid man of the truth of the statement.

And this brings us to the consideration of those checks to the Sparrow's increase which are due solely to the influence of man, and which may be denominated artificial.

DIRECT INFLUENCE OF MAN IN CHECKING THE INCREASE OF THE SPARROW.

Public opinion.—During the first fifteen years of the Sparrow's colonization of America, say from 1855 to 1870, the hostile influence of man was practically nothing. A few protests from intelligent naturalists who opposed its introduction; a few warnings from naturalized citizens who had spent many years fighting the bird in their native land—this was all. On the other hand, scores of enthusiastic "benefactors" of the country were urging its introduction in increased numbers, and aiding and protecting those already brought, by every possible means, even to the enactment of city ordinances and police regulations. During the next decade, however, more opposition was developed, and although Sparrow enthusiasts were still providing nesting boxes by the thousand and food by the barrel in many cities where Sparrows were few, still there was no little retrenchment in some of the cities where they had become abundant, and the disposition among practical citizens to let the invaders shift for themselves steadily increased. Toward the latter part of this period a few laws which had especially protected them were repealed, but in very few places were active measures adopted looking to the limitation or suppression of their increase.

It is impossible to mark the precise date at which the tide of public opinion turned against the Sparrow. There has been no sudden change, but a gradual falling away in the number of Sparrow adherents. One after another of its loudest advocates has become silent, and a few have honestly admitted their change of opinion.

In most cases such change of views has not been the direct result of any one argument, oral or written, but of the gradual accumulation of such an amount of evidence that at last it became irresistible. A man who has seen thousands of Sparrows at work on his own wheat-fields is convinced that the bird is not altogether harmless, whatever may have been his previous theories on the subject. If he subsequently suffers from its attacks upon his fruit, his preconceived notions of Sparrow habits are still further modified; and when he finds that native birds decrease as the Sparrows increase, he is constrained to believe that possibly some of those who have testified to similar experiences were neither fools nor knaves. This leads to a re-examination of the facts on which he based his theories originally, and the result is that his former conclusions are reversed.

Unfortunately, the men whose experience thus qualifies them to speak authoritatively on the subject are not often the men who can and will publish widely their observations and conclusions. Nevertheless, such experiences have become so frequent in all parts of the country during the last few years that the weight of public opinion, especially among agriculturists, is very decidedly against the Sparrow. Since 1880 this change of sentiment has been marked.

Effect of legislation.—Little or no protective legislation has been enacted; many of the laws formerly protecting the Sparrow have been repealed; and in most cases such city regulations as have not been modified have become practically dead-letters.

Moreover, bounties have been offered by some towns and counties, and by one State (Michigan), which now pays a bounty of 1 cent per head on English Sparrows.

The question of the expediency of bounties is discussed elsewhere, and it is sufficient here to remark that as a rule they do not give satisfactory results.

The repeal of protective acts, however, certainly has done much to check the increase of the Sparrow, since it allows persons so disposed to wage open warfare on the bird. So long as it was protected by law little effective action could be taken toward its destruction, though much was done to prevent its increase.

Shooting, poisoning, trapping, nest destroying.—The filthy habits of the Sparrow about buildings everywhere, early led to the use of wire netting or some other protective device about cornices, window casings, etc., while all openings in which it could nest were carefully closed up. Later, these points were kept in mind when planning new buildings, and no available cavities were left. Many people removed the boxes originally put up for the Sparrow as soon as they became familiar with its habits and saw the danger to be expected from its increase. For the same reason food which was lavishly furnished at first was afterward withheld, and the birds were compelled to shift for themselves. Where ornamental vines were disfigured by filth and nesting rubbish the nests were sometimes torn down or the birds driven away by disturbing them repeatedly at night, though there is no doubt that in many cases they remained undisturbed in such places owing to the belief that any other course would be at the risk of prosecution by the town or city authorities.

Such frequent interruption in its domestic affairs naturally did much to prevent the most rapid increase of the Sparrow, but as such efforts were mainly isolated, and affected only certain restricted localities, they had little permanent effect. A Sparrow's preferences are one thing and its necessities another, and when persecuted in one place it has always been easy to find another where, for a time at least, it could rest undisturbed.

In towns and cities where no direct protective legislation existed other methods of limitation, such as trapping, shooting, and poisoning, were possible, but in most cases these methods were limited practically by such city ordinances as forbid the use of fire-arms within city limits, or the use of poisons without special permission. Trapping can be successfully practiced only by a few persons who have the requisite knowledge and appliances, and there is little evidence that the numbers of Sparrows have been much lessened in this way. Much interesting information as to the best methods of trapping Sparrows will be found in the report of Mr. W. T. Hill on this subject. In spite of the fact that during the two years ending October 1, 1887, Mr. Hill trapped upwards of 40,000 Sparrows in Indianapolis, Ind., they are still superabundant there, though said to be considerably less numerous than formerly, especially about the grain elevators, warehouses, etc., his particular field of operations. The birds thus trapped have been used for the most part in shooting matches.

We know of instances in which a single garden or estate has been kept fairly free from Sparrows by continual shooting and the systematic destruction of nests and eggs. Thus Mr. Albert H. Phelps, of West Pawlet, Vt., wrote in 1884:

> On this farm they have been destroyed by breaking up the nests and by shooting for two successive years, and now they do not come here. They are abundant, however, on neighboring farms where they have been undisturbed.

So long as they are destroyed only in a few places they must be followed up every year and not allowed to regain a foothold or they will soon become as numerous as ever.

In September, 1886, Mr. William Kaucher, of Oregon, Mo., wrote:

> They are all shot every spring, but others come in to take their places later. Seventy-five or eighty were thus killed in our court-house park last spring.

About a year later (November 14, 1887) Mr. Kaucher wrote:

> A war of extermination was waged by our citizens against the Sparrows, beginning early in the spring and extending into June, when they were all killed. They are coming in now from other places, but the same course will be followed next year in regard to them. Now, if communities around us could be induced to do the same thing, they could be kept in subjection, if not altogether destroyed.

Under date of March 2, 1888, Mr. Kaucher again wrote to the Commissioner of Agriculture as follows:

> Our city council lately made an appropriation for the purchase of powder for the purpose of killing sparrows. Our sportsmen availed themselves of the opportunity thus afforded, and within the past ten days have killed nearly all that could be found. Something of this kind seems better than the use of poisoned grain.

Similar testimony has been received from a few other places, while individual efforts to exterminate the birds have been quite common, but from the nature of the case only temporarily successful. In places where the first few pairs of Sparrows have been shot or driven away on their appearance, it seems to have been comparatively easy to keep others away as they came, for the Sparrow is naturally observant and suspicious, and only grows bold and aggressive as its numbers become formidable or its position assured.

To judge from the reports of our correspondents, poison has not been used very generally, and when used it has not always given satisfactory results. Still, undoubtedly it has had some effect in restricting the pest, and oftentimes the apparent failure of an experiment has been due to the imperfect methods of administering the poison. This subject is discussed in another place, and it need only be remarked here that the judicious use of poison in winter, especially in Northern cities, will probably afford one of the simplest solutions of the Sparrow problem.

The following examples of testimony serve to show that Sparrows are kept more or less in check in some places through the efforts of individuals, and mainly by the use of the gun.

From T. D. Barron, Saint Clair, Mich.:

I have known of almost entire flocks being killed by persistent shooting in the winter, when they are driven to the barn-yards for food. (October 7, 1886.)

From H. F. Barrell, New Providence, N. J.:

I shoot all I see on my premises in the spring; consequently I have very few. (August, 1885.

From A. H. Wood, Painted Post, N. Y.:

Some are shot, a few poisoned by strychnine, but the increase is principally restricted by destroying the nests. (August 10, 1886.)

From Adolph Leue, Cincinnati, Ohio:

I have shot a great many, but it seemed to do no good. (October 12, 1886.)

From Dr. H. D. Moore, New Lexington, Somerset County, Pa.:

The shotgun has been our only remedy for them. By shooting a part the remainder become shy, and sometimes all leave for weeks at a time. (December, 1885.)

From J. F. C. DuPre, Abbeville C. H., South Carolina:

On my own place within twelve months I have killed over five hundred Sparrows by shooting them with shot cartridges from a 32-caliber rifle. This makes a small report and does not frighten the birds, but it is expensive. (August 30, 1887.)

From Rev. Henry Fairbanks, Saint Johnsbury, Vt.:

A few hundred were shot last summer, but only a private bounty has been paid for their destruction. (February 5, 1884.)

From W. W. Gilman, Stoughton, Dane County, Wis.:

For two or three years past people have been allowed to shoot them inside the city limits for a period of ten to fourteen days during the brooding season, and this summer they turned the hose on their nests and washed them out. (August 30, 1886.)

Use of the Sparrow for food.—During the last half dozen years Sparrows have been used as an article of food in many places in this country, as they have been in Europe for centuries, and the demand for them for this purpose has doubtless lessened their numbers somewhat in and about a few cities. The following examples of testimony illustrate this point.

From J. Percy Moore, Philadelphia, Pa.:

> Immense numbers are killed in the autumn, when feeding on the seeds of reeds in the marshes, and prepared and sold as reed-birds by the restaurants. (September 27, 1886.)

In Albany, N. Y., Sparrows were regularly quoted in the market reports during the fall of 1887, bringing $1 per hundred, or 25 cents per dozen.

The following extracts from the Albany Express show that the birds are appreciated there:

> Sparrows are still a feature of the market, and one Albany lad, Charles Lambert by name, shot one hundred and thirty-five of the little pests Saturday, out of a single flock of about five hundred, on the outskirts of the city. A well-known game and poultry dealer took in one thousand seven hundred of them last week and sold about all. Yesterday the same man disposed of two hundred. (November 7, 1887.)
>
> The Albany youth are still waging war on the Sparrows, and they are all gradually being driven from the city. One game and poultry dealer in town has thus far bought and then sold to others about three thousand eight hundred of the little pests. They make excellent pot-pie and are regarded as excellent eating by those who have made the trial. The flavor is said to be somewhat like that of reed-birds and much superior to quail. (November 18, 1887.)

It will appear from the foregoing statements, and still more forcibly from an examination of the testimony on which they are based, that although man originally did much to aid in the increase and spread of the Sparrow, he has done comparatively little as yet to restrain this increase and lessen or prevent the evil which his ignorance and thoughtlessness have caused.

How the farmers of Great Britain regard the Sparrow.—The very fact that in Europe the good and bad characteristics of the Sparrow had been discussed for centuries without any absolute settlement of the question should have made us cautious in introducing it to America; and when, later, the calamitous results of its introduction to Australia and New Zealand became evident, steps should have been taken at once to prevent its further spread in this country. The following statement of Mr. Jabez Webster, a practical nurseryman and fruit-grower, serves to show how much trouble might have been prevented by a little intelligent inquiry among the farmers of the Sparrow's native land, before bringing the bird to our shores.

Mr. Webster writes:

> After twenty-two years' residence in the United States I visited England, Scotland, and Wales, traveling and observing in most of the counties of England and sister countries. I found that intelligent agriculturists and horticulturists everywhere I went were astonished that the American people should have introduced so destructive and worthless a bird into their country. One gentleman in the county of Norfolk said that in that county they had been spending money to destroy Sparrows for fifty years, and still had to spend money. I found the same opinion prevailed among well-informed persons in country and town in Bedfordshire, Huntington, Stafford, War-

wickshire, Yorkshire, Lancashire, in Scotland and Wales, and in the great small-fruit counties of Surrey and Kent. (Centralia, Ill., December 21, 1886.)

There can be no question that a thousand times as much energy and money have been spent already in fighting Sparrows in America as were expended in introducing and caring for them at first, but the results of the efforts in the two cases are painfully disproportionate.

The magnitude of the evil and the absolute necessity of taking active and comprehensive measures for its abatement will be better understood after an examination of the following seven sections which precede the recommendations which we hope may lead finally to the extermination of the European House Sparrow in America.

INJURY TO BUDS, BLOSSOMS, AND FOLIAGE.

The direct evidence as to the alleged injury to buds, blossoms, and foliage by the Sparrow comes from 31 States, the District of Columbia, and Canada, and consists of reports from 584 observers. Of these, 265 allege positive damage of varying kind and degree; 12 are indeterminate; and the remaining 307 are favorable to the Sparrow, at least negatively, inasmuch as they report no damage of this kind observed. By far the greater part (294) of these negative reports, however, have little weight, being brief, often monosyllabic, negatives written in reply to the schedule questions, without anything to indicate the extent or closeness of the writer's observation. Less than one-twentieth—scarcely more than a dozen reports, in fact—indicate that, in spite of good opportunities and careful observation, no injury to buds or foliage has been noted. Ninety observers report injuries to foliage of vines, shrubs, and trees through the Sparrow's roosting or nesting in them in large numbers. One hundred and twelve report injuries from the eating or wanton destruction of buds and blossoms of fruit trees. Forty-six report injuries to buds of other kinds; and thirty-four report injuries to trees or vines without specifying the nature or extent of the damage.

INJURY BY FILTH.

The question of injury by filth can hardly be called a question at all, as it is one of the points against the bird which is universally conceded, even by its stanchest friends. It is perfectly safe to say that in every town or city in the Union where Sparrows are really abundant very many ornamental trees and vines are annually injured from this cause alone, and the statement that such damage is not known at any point may be taken as conclusive evidence that the Sparrow is by no means abundant there. A few scores of Sparrows may roost constantly in a large vine or group of trees without doing material injury, but when, as is frequently the case, several hundreds or even *thousands* roost together, so that the vines or branches are actually crowded with them, the beauty of the foliage is seriously marred or altogether destroyed and the life of the trees or vines is endangered.

A few examples will suffice to illustrate this statement.

Mr. Robert Ridgway, Ornithologist of the Smithsonian Institution, says:

> It is injurious to ornamental vines, etc., by the chemical action of its excrement. The luxuriant English ivy which once covered portions of the Smithsonian building was thus totally destroyed.

Dr. Frank H. Braymer, of West Pawlet, Vt., under date of August 31, 1886, writes:

> All evergreen trees and hedges are injured by the birds roosting in them. The leaves drop off and in many instances large sections of a hedge die.

Ernest D. Wintle, of Montreal, Canada, writes:

> They build their nests in the vines that are trained against walls of houses here, and the vines are killed by the large quantity of nesting material and by the excrement from the birds. (September 20, 1886.)

Other reports are:

From Fred. S. Odle, Lapeer, Mich.:

> There are two large maple trees in our town which are particular haunts of the Sparrow, and which they have nearly ruined.

From L. M. Mottweiler, Georgetown, Ind.:

> It injures trees and vines by roosting in them. I had to cut away my ornamental trees on account of the number of Sparrows near the house. They now roost in my grape-vines.

From Charles H. Lawton and John J. Peckham, Newport, R. I.:

> It injures hardy ivies on buildings, also pine trees. We know of parties who have had to cut down trees on account of the Sparrows.

From William Saunders, superintendent of garden and grounds of the Department of Agriculture, Washington, D. C.:

> They seriously disfigure ornamental vines by their nests and droppings. *Ampelopsis Veitchii* affords them one of the best nesting and roosting places, and suffers correspondingly.

The damage occasioned to vines in which large numbers of Sparrows nest is too well known to require comment, but the following statement will give some idea of the numbers which nest in such vines when favorably situated. Eli W. Blake, 3d, of Providence, R. I., says:

> During the season of 1884, from April 22 to June 27, inclusive, I took, in company with a friend, 995 Sparrows' eggs from the ivy covering the walls of St. Stephen's Church, on George street, in this city. I did not count the nests, but estimate the number at about fifty-five or sixty * * *
>
> I have reason to suppose that eggs were occasionally taken during this period without my knowledge; the figures given, however, I can personally vouch for. * * * The same year (1884) that I took the eggs from St. Stephen's, the sexton of St. John's Church, also in this city, took 970 eggs and two cart-loads of nests from that building, *at one time*. (April 20, 1886.)

Other kinds of injury, less general and not so serious as the preceding, but still not to be ignored, are specified in the following replies:

Dr. George J. Fisher, of Sing Sing, N. Y., writes:

> They roost on my English ivy and injure it by picking off hundreds of fresh green leaves. I find the leaf stalks fairly chewed by them. They also disfigure the foliage by their excrement. (March 18, 1887.)

J. Percy Moore, of Philadelphia, Pa., writes:

A lady living in Doylestown, Pa., mentioned to me that she had seen the Sparrow wantonly pull off the leaves of a silver maple growing in front of her house. (August 11, 1885.)

October 11, 1885, I saw a number of the same species pulling off the leaves of the common locust tree. They seemed to be biting off and eating the fleshy bases of the leaf stems. Large numbers of leaves were thus treated and let fall to the ground.

Benjamin F. Hess, of Phœnix, N. Y., writes:

I have many times seen a flock in a shade tree biting off the leaves and letting them fall. (August 25, 1886.)

Dr. Howard Jones, of Circleville, Pickaway County, Ohio, writes:

They tear from walls by their weight the fin-leafed ivy, hundreds of them often alighting at one time among the branches. (August 19, 1886.)

Charles M. Clapp, of Albion, Ind., writes:

Last spring they would alight on the young grape-vine sprouts and break them off. (October 14, 1886.)

DESTRUCTION OF BUDS AND BLOSSOMS.

But serious as is the injury occasioned by the filthy habits of the Sparrow, it sinks into insignificance beside the destruction of buds and blossoms in winter and spring. This, like the preceding charge, is one which many of the Sparrow's friends admit without argument, but there are still a few who believe that in destroying buds the bird is only seeking and destroying insects hidden within, while a still smaller number deny that the Sparrow ever eats enough buds to do any harm.

The most which can be said for the Sparrow in extenuation of this habit is that the damage done does not *seem* to be serious in all cases; but, even if this be true, it is an extremely weak defense, for the injury is sure to increase as the Sparrows become more numerous. The greatest damage will result from the presence of large numbers of Sparrows among a few fruit trees, and where these relations are reversed little damage is like to ensue.

It has been claimed that the buds or blossoms taken by the Sparrow cause no loss of fruit, since only a small proportion of blossoms could develop fully under any circumstances. But this claim is based on the assumption that the bird takes but a small proportion of the buds on any tree, and that the loss is evenly distributed; whereas, in point of fact, there is no such equalization of the loss, but entire twigs or branches are stripped at a single visit, and the consequent loss of fruit is inevitable. A thousand blossoms might be picked by hand from a peach tree without lessening the crop in the least, but if the same number of blossoms were destroyed by Sparrows it could not fail to affect the yield of that tree materially.

A point more frequently made, and with far less evidence in its favor, is the claim that Sparrows select only the buds or blossoms which are infested with insects. There is scarcely a shadow of evidence on which to base such a claim. So far as we are aware, not a single bird shot in the act of bud-eating has been found to contain traces of any insect, while perfectly sound buds and fragments of sound blossoms are found by the score in such birds.

The Sparrow does eat insects sometimes, but it gets them from other places than from buds and blossoms, which latter it destroys mainly for the material of which they are composed, though at times it seems to destroy them simply for pleasure.

The well-known fact that many insectivorous birds frequent blossoming fruit trees and feast on the insects attracted by the flowers, appears to have led some friends of the Sparrow to believe that this bird has similar habits. Although our own investigations do not bear out this belief, yet in deference to the opinions of those who hold other views, we insert here a few of the strongest and most favorable statements received, and others will be found in full in their proper places with the systematic evidence on this question.

From Hon. Nicolas Pike, Brooklyn, N. Y.:

> It positively does not injure trees. I know it to be beneficial to the grape-vines. (February 8, 1884.)

From W. J. Kenyon, Brooklyn, N. Y.:

> It picked the buds off my peach trees, but I found that it only picked buds that had grubs in them. (September 4, 1886.)

From Dr. H. A. Hagen, Cambridge, Mass.:

> I have never seen it injure trees by picking off buds, but have seen it examining about the buds of cherry and pear trees for little insects; and then we had a better crop of fruit. (April 13, 1884.)

From Thomas Chalmers, Holyoke, Mass.:

> It benefits rather than injures the shade, fruit, and ornamental trees. The trees of Holyoke, once so festooned with abominable crawlers, are now a pleasure to look at. (March 6, 1884.)

From W. H. Ragan, Greencastle, Ind.:

> As yet they do no serious injury to trees and vines; I can not think of an instance. Though many serious charges are made against them, I believe them to be without foundation. (September 28, 1886.)

From Joseph M. Wade, Boston, Mass.:

> I have known it well for forty-four years, and never knew it to be charged seriously with injuring shade, fruit, or ornamental trees. (January 31, 1884.)

It is surprising that this bud-eating habit of the Sparrow should be overlooked so generally, when anyone so disposed can see the birds cutting buds daily in the shade trees along the streets of any town or village where Sparrows abound. The habit is not peculiar to a few individuals, nor is it confined to buds and blossoms of any particular tree or shrub, or limited to any one or two months. Sparrows enjoy buds and blossoms at any time, but eat more of them in spring-time, because they are more abundant and tender then, and perhaps in part because other food is somewhat less abundant.

On the grounds of the Department of Agriculture the Sparrows have been carefully watched for several years, and they have been seen to eat buds and blossoms of many kinds, and at almost all seasons. The following observations recently made by a member of the Division illustrate several of the points just mentioned:

> On the 22d of February while crossing the grounds of the Department of Agriculture, my attention was attracted by the chattering of a large flock of Sparrows, which had gathered in a clump of shrubs, mainly the Japanese jessamine (*Forsythia viridissima*). There were thirty or more bushes, leafless as yet, but heavy with flower buds, which already began to show the yellow.
>
> The day was sunny and calm, and on walking quietly up among the bushes the Sparrows were found preening themselves and nipping off the flower buds in almost every bush. Some of the birds were giving their entire attention to their feathers, while others were equally devoted to the buds. Beneath many of the bushes the ground was thickly strewn with the green and yellow remnants of buds, and under a few of the bushes, near the center of the group, they lay so thickly as to entirely obscure the ground, while the branches above were completely stripped of buds, except near the tips. The birds seemed to prefer to sit quietly near the center of each bush and nip all the buds within reach, and no Sparrows were seen eating buds near the tips of the branches, which were so slender as scarcely to sustain their weight.
>
> On alarming the birds, they flew into some poplars near, where it was easy to estimate their numbers, and there proved to be between two hundred and fifty and three hundred birds in the flock.
>
> In April, when the flowers of *Forsythia* were well expanded, the bushes which had suffered most showed the effects very plainly, but as those around the edge of the group, and particularly the outer branches, suffered least, the general effect was not noticeably impaired. The incident, however, serves to show the Sparrow's fondness for flower buds and the danger to be apprehended from its work on the blossoms of fruit trees.
>
> During the last ten days of February and the whole of March scarcely a day passed when Sparrows were not seen eating the buds of shade trees throughout the city. Frequently a dozen would be seen at work in a maple or elm tree, and one could stand below them within two or three yards and see every motion made, even catching the mutilated buds in his hand as they fell. The buds of poplars, cottonwoods, box-elders, maples, elms, and several other species were constantly destroyed in this way, and the Sparrows seemed to take particular pleasure in pulling to pieces the catkins of the various species of poplar.
>
> Since the middle of April, when the peach blossoms began to unfold, the Sparrows are to be seen at all hours of the day hopping or creeping about the peach trees, and leaving little but worthless buds behind. For two or three days past I have been watching with a powerful field-glass a dozen or more peach trees in full blossom, and less than a hundred yards from my windows. The glass enables me to see distinctly the stamens in the blossoms, and they are frequently seen sticking to the bills of the Sparrows as they move deliberately about among the branches destroying thousands of blossoms. Occasionally a flock of a dozen or more is to be seen in a single tree, but ordinarily they forage singly or in squads of three to six. So far as can be seen by the unaided eye, all seem to be similarly employed, and every one thus far watched with the glass has proved to be destroying blossoms or buds at the rate of five to ten a minute. One bird, an adult male, was seen to cut into and ruin nineteen blossoms on one spray in less than two and one-half minutes. He began at the base of the shoot and nipped all within reach, then climbed slowly upward, parrot fashion, destroying every bud on the twig as he went, until the tip was nearly reached, when his weight proved too great, and losing his balance in trying to reach the terminal flower he fluttered off to another branch to begin again. This bird, like others ob-

served, seemed to prefer to put his bill down into the open flower and cut out the center, but if the blossom chanced to stand in such a position that this could not be done readily, he bit off the entire blossom close to the stem, and apparently dropped it all to the ground. In several instances Sparrows were seen to pinch off and drop three buds in succession in as many seconds, and this seemed to be done without any cause, unless possibly because they were in the way, or because they were so placed as not to be easily reached from the right side.

On several of the trees which I examined carefully with the glass more than half the blossoms were wilted and mutilated, and repeatedly Sparrows were seen to alight on twigs which contained few but ruined blossoms, and after a quick glance pass on to sprays of untouched flowers. (W. B. B.)

Abundant evidence is at hand to show that such proceedings as that just described are not exceptional, but of regular and frequent occurrence, and there can be no doubt that often the crop of fruit is seriously lessened in this way.

The injury is by no means confined to the buds and blossoms of peaches, for cherries, grapes, plums, and pears suffer almost as much, and few, if any, fruit trees escape attack altogether. The following list shows the kinds of buds and blossoms which suffer most, and the number of observers reporting injury to each kind:

	Reports.		Reports.
Peach	24	Currant	6
Pear	22	Maple	9
Grape	21	Elm	7
Plum	17	Other shade trees	8
Cherry	14	Evergreens	9
Apple	16		

And two or three reports each of injury to buds of the quince, apricot, orange, fig, lilac, etc.

All these reports are well worth reading entire, but we insert only a few here, sufficient to confirm the foregoing statements.

William Saunders, of Washington, D. C., superintendent of garden and grounds of the Department of Agriculture, writes:

I have a peach tree in my yard, the branches of which are within three feet of my bedroom window. It is now nearly in full flower, and, as usual, the Sparrows busy themselves in pecking at the blossoms. I watched them closely this morning, and found that they almost uniformly made two pecks, and two only, at each blossom. First one or two petals were removed and discarded, then another peck was made, and so on to other flowers. After watching them for some time, I opened the window blinds (through which I had been watching the birds) and found that the embryo fruit was removed from all the blossoms thus operated upon. By removing a petal or two on one side of the flower the embryo fruit was easily secured. Unopened buds seemed to be preferred. All the flowers thus destroyed were not removed or broken off; only an occasional bud would fall to the ground. The fruit embryos were removed so dexterously that the remnants of the blossom still stuck to the twigs. (April 14, 1887.)

Within the last few days the Sparrows have attacked and seriously injured the flower buds of a blue and white Wistaria on my house. The flower clusters are still quite small, only about three inches in length, and downy and tender. The birds are pulling them all to pieces, and the ground in the vicinity is strewn with fragments. Last year the vine was loaded with magnificent clusters of flowers, but this year I shall have very few, and those low down, where the Sparrows are afraid to come. (April 25, 1887.)

Prof. O. T. Mason, of Washington, D. C., writes:

Previously to 1882 I lived in what is now called University Park, where I had a great many fruit trees, including pears. I have sat in my study window many times and watched the English Sparrows picking at the pear-tree buds just when they began to swell.

It was not until I had lost one or two crops that I gave close scrutiny to their actions and found that they were picking out the flower portion of the buds and eating them. After that I gave orders to allow no Sparrows in the garden, and had no trouble in securing a crop of pears. (February 9, 1886.)

Sereno Edwards Todd, of Orange, Essex County, N. J., writes:

It often ruins the pear crop by eating all the buds in cold weather. (September 6, 1886.)

W. E. Saunders, of London, Ontario, Canada, writes:

One year—1882, I think—it stripped a Flemish Beauty pear tree of blossoms so that we had no fruit from it. (December, 1885.)

Dr. B. H. Warren, State Ornithologist of Pennsylvania, West Chester, Chester County, Pa., writes:

It devours the fruit buds of pear, peach, and plum trees, and also grape-vine buds. The buds and blossoms (especially buds) of the numerous varieties of pear are devoured and otherwise destroyed to a very considerable extent in this section. (January, 1887.)

William F. Doertenbach, of Cleveland, Ohio, writes:

This spring (1886) the Sparrows picked the blossoms off a plum tree in my yard. I cut a branch full of blossoms and examined them closely and there were no insects in the blossoms. (November 8, 1886. Present about thirteen years.)

Dr. C. P. Blachly, of Manhattan, Kans., writes:

When the first three or four pairs of English Sparrows came here I observed one of the birds very busy on the branch of a plum bush. After about a minute's time I examined the branch and found all but two or three buds had been nipped off, there being upwards of fifty buds gone, and apparently just nipped off. (November, 1885.)

Elisha Slade, of Somerset, Bristol County, Mass., writes:

In spring it injures the swelling buds and young leaves of the apple, pear, peach, plum, cherry, and quince trees, and currant and gooseberry bushes. Sometimes the injury is slight, but often serious. (October 19, 1885.)

This injury is very noticeable on quinces and dwarf pears, currants, raspberry vines, and small trees. (August 20, 1886. Present about twelve years.)

Henry Stewart, of Hackensack, N. J., writes:

Early last spring it picked open many apple buds so that the ground under the trees was covered with them. (February 5, 1884. Present about fourteen years.)

Prof. B. W. Evermann writes from Bloomington, Monroe County, Ind.:

I have often noticed them eating, or biting off, the blossoms of apple trees. (August 25, 1886. Present about eleven years.)

W. V. Osterhout writes from Providence, R. I.:

I have seen it destroying the buds of the elm (our principal shade tree) and of grapevines; it also destroys cherry, pear, and peach blossoms. A friend of mine was for two years unable to obtain enough fruit from his two cherry trees to warrant picking, although the trees were healthy and in good bearing, all on account of the destruction of buds, flowers, and fruit by the Sparrow. (May 8, 1887.)

Otto Lugger, of Baltimore, Md., writes:

The buds and blossoms of my two small orange trees have just been entirely detroyed by the Sparrows. The trees had been housed through the winter, but were put out of doors in the spring, and each had from 75 to 100 buds. As long as the buds were small the Sparrows took no notice of them, but as soon as they began to show much white they were attacked. Strips of red flannel were tied on the trees, and kept the birds away for a day or two, but at the end of five days only four buds were left, and three of these were eaten as soon as they opened. (May 30, 1887.)

The postmaster at Schriever, Terre Bonne Parish, La., writes:

It injures peach trees and orange blossoms. (October 8, 1886. Present about one year.)

Thomas McIlwraith, of Hamilton, Ontario, Canada, writes:

It eats fruit buds, and one season it attacked my grape-vines just as the leaves were opening, and ate the heart of the buds. Since that time I have had to scare the birds away while the vines are at that stage. (March 10, 1884. Present about ten years.)

Dr. H. D. Moore writes from New Lexington, Somerset County, Pa.:

I have seen it destroy the grape blossoms and setting of young grapes, and have heard my neighbors say that they have seen the same thing. (September 13, 1886. Present about eleven years.)

Mrs. Wm. Pitkin, of Rochester, N. Y., writes:

I discovered that during the early morning hours flocks of Sparrows were busily engaged in picking out the germ of fruit in blossoms, and also stripping whole bunches of small grapes until not one would be left upon a stem. The rapidity with which they ate their breakfast was surprising. I endeavored from season to season to keep them away by driving them off, but this produced only temporary effect. This last summer I spread netting over and along the sides of the frames (one side is sufficient) immediately upon the appearance of the fruit buds. The Sparrows were too wary to frequent any part of my garden until the nets were removed, which was done before the fruit was of full size. I have never seen a large grape attacked, either green or ripe. The result of my experiment has been an abundant supply of grapes of many varieties after several seasons of loss and disappointment. (September 19, 1887.)

Francis Gladwin, of Akron, Ohio, writes:

I have a small orchard of dwarf apple trees, and during the cold weather I noticed the Sparrows alighting on the trees every day; when I came to examine the trees in the early spring I found almost all of the large fruit buds broken or pecked off, destroying the crop of apples completely for this year. What with the bugs and humbugs (Sparrows) it is almost useless to try to raise anything. I think we ought to be allowed to fire at the Sparrows even if it is in the city limits. (November 1, 1887.)

Robert Williamson of Troy, Madison County, Ill., testifies:

I saw it in large numbers on my currant bushes last winter, and on examining them found two-thirds of the buds eaten off. (October 2, 1886. Present ten years.)

J. F. Niesz, of Canton, Stark County, Ohio, says:

Sparrows injure fruit trees and shrubbery by stripping off the buds in winter and early spring. Lilacs suffer especially. (September 6, 1886. Present about three years.)

Charles B. Fuller, of Portland, Me., says:

I have seen them "bud" elms so as to seriously injure the trees. (May 31, 1884. Present about twenty-six years.)

Dr. W. S. Strode, of Bernadotte, Fulton County, Ill., writes:

In one of my country drives early last March I saw a large number of birds, that seemed new to me, busily flitting about in the tops of some elm trees. Thinking to obtain a skin of something rare I fired amongst them, and brought two to the ground, and to my disgust found them to be *Passer domesticus*, their bills besmeared and their crops distended with the buds of the elm, on which they were gormandizing. (September 7, 1887. Present two or three years.)

INJURY TO FRUITS, GARDEN SEEDS, AND VEGETABLES.

Evidence on this question was received from 788 persons, of whom 472 gave testimony against the Sparrow, 279 gave testimony more or less favorable (but, as under the preceding question, mainly negative, as the result of scant observation), and 37 gave testimony which was partly favorable and partly unfavorable.

The following list shows (roughly) the number and character of the reports furnished from each State:

State.	Favorable.	Unfavorable.	Total.	State.	Favorable.	Unfavorable.	Total.
Michigan	49	34	74	Pennsylvania	6	32	38
Indiana	23	38	61	Massachusetts	14	18	32
New York	23	36	59	Iowa	16	9	25
Ohio	20	39	59	Connecticut	8	16	24
Illinois	25	27	53	Kansas	7	15	22
Kentucky	24	29	53	California	3	17	20
Georgia	15	26	41	New Jersey	2	15	17

Twenty other States and Territories sent from 1 to 12 reports each, aggregating 135, of which 49 were favorable, 84 unfavorable, and 2 indefinite. Canada sent 20 reports; 13 favorable, and 7 unfavorable.

The injuries specified in the unfavorable reports are distributed as follows:

Fruits, ripe or ripening.

	Reports.		Reports.
Grapes	127	Blackberries	8
Cherries	58	Peaches	7
Strawberries	39	Figs	3
Raspberries	31	Gooseberries	3
Apples	22	Mulberries	2
Currants	21	Wild cherries	2
Pears	16	Apricots	1
Plums	14	Fruits, kind not specified	83
Tomatoes	10	Small fruits, kind not specified	10

Vegetables, green, and mostly young.

Young peas, just coming up	25	Young beet plants or leaves	8
Pea blossoms	12	Young turnip plants or leaves	2
Green peas from the pod	14	Young radish plants or leaves	3
Peas, kind not specified	30	Young corn, just coming up	1
Beans, kind not specified	5	Garden corn in the ear	22
Young lettuce plants or leaves	27	Young plants, kind not specified	20
Young cabbage plants or leaves	16	Garden vegetables, kind not specified	79

Garden seeds.

Lettuce	14	Radish	6
Cabbage	12	Flower	4
Beet	4	Sunflower	29
Turnip	15	Garden, kinds not specified	35

A few reports also mention injury to either the seed or young plants of mustard, spinach, hemp, flax, artichoke, salsify, cauliflower, carrot, parsnip, tobacco, pepper, etc., while one report mentions serious injury to tube-roses, another to tulips, and still another to sweet peas. It will be seen from this summary that there is scarcely a garden fruit or vegetable which does not suffer, at least occasionally, from the attacks of the Sparrow, although some garden products are much more seriously injured than others.

INJURY TO FRUITS.

INJURY TO GRAPES.

Among fruits, grapes appear to suffer most, and, although many grapes are raised without protection in places where Sparrows are considered fairly abundant, there is every reason to believe that sooner or later this bird will discover and injure them wherever its increase is tolerated. It has been shown that grape buds are frequently destroyed in the early spring, and the fact that one hundred and twenty-seven observers, representing twenty-six States and the District of Columbia, now bear witness to injury to the ripening fruit, may well cause apprehension among grape-growers who have not suffered any loss as yet.

In California, where grape culture is an industry of paramount importance, the English Sparrow has taken firm root and is multiplying and spreading with ominious rapidity; and unless steps are taken to wipe out the pest at the earliest possible moment the result probably will entail a loss to the State of many thousands, if not millions, of dollars.

It must not be supposed for a moment that we have overlooked the fact that other birds than the Sparrow eat grapes, and we are even willing to admit that occasionally some of the damage done may have been wrongly attributed to the Sparrow. This, however, does not justify the claim made by some friends of the latter bird, that he is *always*, or even frequently, innocent of this charge. It often happens that grapes are destroyed by birds in places where there are no English Sparrows; and, on the other hand, it as frequently happens that the same fruit is destroyed by Sparrows in places where there are no other birds. Perhaps this absence of birds, coupled with the fact that many wasps and bees feed on injured or over-ripe fruit, has led some people to attribute all this injury to insects. Thus the Rev. W. M. Beauchamp, of Baldwinsville, Onondaga County, N. Y., writes:

> It seems altogether a mistake to suppose they [the Sparrows] injure grapes or other fruits. They are scarcely ever seen in my garden, but my grapes and plums suffer fearfully from bees. A year ago I made a special study of the destruction of grapes for several weeks, and demonstrated that the bees alone were the aggressors, neither birds, hornets, nor wasps coming near the fruit all that time. (October 15, 1885.)

Careful experiments made by the Entomological Division of the Department of Agriculture show conclusively that bees can only injure fruit under very exceptional circumstances. More than twenty varieties of grapes were placed within easy reach of hungry bees, which made every effort to eat them but were unable in a single instance to break the skin of sound grapes. (See Annual Report of Commissioner of Agriculture for 1885.) Bees and wasps, especially "yellow jackets," often destroy ripe fruits of various kinds as soon as an opening through the skin has been made, but it remains to be proved that they are *ever* the first aggressors, and the structure of the mouth parts of honey bees seems to preclude the possibility of their ever breaking the skin of grapes.

Of course we have received many reports (about 25 in all) to the effect that the Sparrow has not been observed to injure grapes, and perhaps half a dozen of these observers state positively that in their opinion it never does injure them.

Dr. J. R. Mathers, of Buckhannon, W. Va., where the Sparrow has been present for five years or more, writes:

> I raise quantities of grapes and have never known the Sparrow to touch them, nor have I ever heard any complaint from others on this head. (August 24, 1885.)

Mr. Frank Little, of Kalamazoo, Mich., writes:

> I have an extensive garden of fruit (particularly grapes), vegetables, sweet corn, and flowers. While the Sparrows frequent the street in front of my house, I have never seen them doing any harm in the garden. (September 6, 1886. Present six or eight years.)

There is nothing whatever in these statements which is open to question. They are statements of fact, and as such should be accepted as evidence, but it should be remembered that this is merely negative evidence, and only tends to prove that the Sparrow does not always feed on fruit even when readily accessible. It takes nothing from the force of the positive evidence already given, and the only point of difficulty which it raises is the question why the bird should eat fruit only at some times instead of at all times; a question which could be certainly and fully answered if we had all the data naturally pertaining to the case. Failing this, we can only say that probably food of other kinds was so abundant the Sparrows took but little fruit anywhere, and this little was found more easily elsewhere, or was taken unobserved and was never missed. Or, perhaps the very abundance of fruit and the limited numbers of the birds prevented any noticeable damage. The fact that the Sparrows are not actually seen doing the mischief is never surprising to one who has watched them closely, for they are among the most wary and cunning of birds, especially after they have been detected once in mischief of any kind. There is every reason to believe, however, that the taste for fruit is one which not all English Sparrows acquire, or which at least is not held to the same extent by all.

It can not be denied that some fruit-growers suffer much greater loss from Sparrows than others, when, so far as can be determined, the conditions are almost identical; and it seems probable that, as many persons believe, if the Sparrows are shot at or thoroughly frightened on their *first* visit to a vineyard, orchard, or garden, they are much less likely to be troublesome afterwards. The habit of feeding there once formed, it is very difficult to prevent continual annoyance and loss.

One thing has been noticed repeatedly with regard to the depredations of the Sparrow, namely the abrupt and often unaccountable manner in which it appears at or disappears from a place, or changes its attention from one crop to another. A place entirely free from Sparrows this year may be overrun with them next year; and a crop which has remained unmolested in past years may be attacked and seriously damaged without any preliminary sampling or warning. Thus, Mr. Thomas Mikesell, of Wauseon, Fulton County, Ohio, wrote under date of April 24, 1886:

> I have not known it to injure grapes or other fruit, and hear no complaints from any one.

But within six months Mr. Mikesell wrote again, saying:

> It destroys large quantities of grapes by picking holes in the berries and sucking the juice. I have seen them at it. (November 15, 1886.)

At Bernadotte, Fulton County, Ill., the Sparrow has only been established for two or three years, yet during the past season it has been very destructive to grapes in that vicinity.

Dr. W. S. Strode, of Bernadotte, after stating (September 7, 1887) that he has recently found large quantities of grape pulp in the stomachs of Sparrows which he examined, says:

> The variety of grape mostly destroyed is the Concord, as no other to any extent is cultivated here. My observations have, for the most part, been in and around the villages of Bernadotte and Smithfield, country towns with a population of about 225 each—no city nearer than Galesburgh, 40 miles distant; Peoria, 50 miles.
>
> Bernadotte is on Spoon River, 20 miles from its mouth at Havana, surrounded by hill and valley farms. Smithfield is 6 miles north, and in the vineyards within a mile of these villages the greater part of the damage has been done to the grape crop; one citizen of Smithfield estimating that in his vineyard of 2 acres one-half of all the grapes were devoured by the vagrants * * * By personal inspection of the vineyard of 600 vines belonging to Mr. Willard F. Smith, one and a half miles south of Bernadotte, I estimated that one-third of all the grapes on the bunches had been sucked out or pulled off. Estimating the crop at 10 pounds to the vine and at 3 cents per pound, the loss can be easily estimated.

It must not be forgotten that the Sparrow is a typical seed-eater and depends on seeds for its main support. It unquestionably could live indefinitely on seed alone, and it is possible that it could not exist for any considerable time on fruit alone. The abundance of a favorite food, such as grain, might often prevent serious damage to fruit. But Sparrows, like most other birds, prefer and need variety in diet, and even amid an abundance of grain food they undoubtedly relish an occasional taste of fruit. Thus, where they become very numerous and the supply of fruit is not large even this occasional taste becomes a serious thing for the gardener, while, on the other hand, sections in which fruit is grown almost exclusively are not likely to feel the losses they occasion.

In this connection it may be well to give briefly the results of an examination of the relations of Sparrows to grapes, made by direction of the Commissioner of Agriculture in September, 1887. In accordance with instructions, the assistant ornithologist some time among the vineyards of western New York, in collecting facts as to the attitude of the Sparrow toward grapes. The points visited were mainly in the vicinity of Geneva, Watkins, Canandaigua, Penn Yan, Keuka, Hammondsport, Bath, and Rochester; three days being spent in the the extensive vineyards about Seneca and Keuka Lakes in Yates and Steuben Counties. Some complaints were heard at almost every point visited, but it must be confessed that very little evidence decidedly unfavorable to the Sparrow was collected, except in the immediate vicinity of towns.

Sparrows were found scattered about in several vineyards, but were nowhere abundant, and although many bushels of ruined grapes were seen, and some of the owners attributed most of the damage to the Sparrows, no perfectly conclusive evidence of this could be obtained. Nor is this to be wondered at when we consider all the facts in the case. Take Keuka Lake, for instance, the shores of which are almost uniformly covered with vineyards, more than 10,000 acres of which are already bearing. The two principal towns on this lake, Hammondsport and Penn Yan, about 20 miles apart, are fairly supplied with Sparrows. Between these two towns, along both shores of the lake, no other crop than grapes is grown, and but for the presence of weeds, there would be nothing else to tempt the Sparrows.

In many of the vineyards, however, the weeds are purposely allowed to grow unchecked between the rows so that they may be used for mulching in winter. The heavy crop of seed thus grown undoubtedly is a considerable protection to the grapes, as the Sparrows feed by preference on seed, and the damage which the few now present could do among so many grapes would scarcely be noticed.

In one vineyard on Keuka Lake a flock of about 100 Sparrows was found apparently feeding on the grapes, and the superintendent of the vineyard, Mr. A. Baker, testified most positively that they had done much damage to the crop. Two birds were shot from this flock, but their stomachs contained considerable numbers of weed seeds and no traces of grapes.

About Keuka Lake, there certainly were not more than two Sparrows to an acre of grapes, on an average, and so long as this proportion is not greatly changed no serious injury from this source need be feared. Moreover, as grape-culture yields far better returns than grain-growing in this region, and as the country is not thickly settled and the winters are long and snowy, it would not be difficult to restrict the increase of the Sparrows so as to make them practically harmless.

Even in the vicinity of Rochester, the Sparrow is not abundant in the sense in which it is abundant about more southern cities of equal size; and yet many complaints of injury to grapes were received from that city and the surrounding country. At the vineyard of Messrs. Elwanger & Barry, about a mile south of the city, considerable damage had been done to Niagara and Dutchess grapes, but the superintendent, Mr. J. Gardner, was sure this was entirely due to robins and other native birds, and stated that although the Sparrows did considerable damage to wheat in the neighborhood, they seldom visited the vineyard after the grapes began to ripen. On the other hand, Mr. Henry Harrison, living in the city, lost about one-half of one variety of early grape (*Israella*) growing in his garden, through the depredations of Sparrows; Mr. Jennings, living about a mile and a-half northeast of the city, had suffered considerable loss of Concords and Delawares in the same way; and at Rush, about 12 miles south of Rochester, Sparrows destroyed a large proportion of the grapes of Mr. W. G. Markham.

Among those who have suffered from the Sparrow's depredations on grapes, there appears to be some difference of opinion as to the motive of the bird, some believing that it eats only the seeds, others only the juice or pulp, while still others contend that it punctures the grapes wantonly and with no intention of eating any of them. From all the evidence obtainable on this point, it seems probable that each of these views is in part correct, but that ordinarily the chief attraction is in the juice or pulp of the grape, which the birds seem really to enjoy. Grape-seeds have been found in their stomachs very rarely, and grape skins never, so far as we are aware.

Those who have watched closely the movements of the Sparrow when among the grapes agree that he pecks many more grapes than he eats, and his actions at such times, together with the fact that he frequently picks off leaves and shoots, which he does not eat, lend some color to the statements that he willfully destroys simply for the pleasure of destruction.

But in whatever manner accomplished, the injury to grapes is certainly serious, for even if but one or two grapes on a bunch are punctured, their decay soon affects the others in the cluster, and mutilated clusters are practically worthless for market.

The States reporting most injury to grapes are as follows:

	Reports.		Reports.
New York	15	New Jersey	8
Kentucky	12	Kansas	5
Ohio	12	Iowa	4
Indiana	11	Georgia	4
Pennsylvania	10	Illinois	4
Michigan	9	Rhode Island	3
Massachusetts	8	District of Columbia	2
Connecticut	8		

Twelve other States sent one report each.

The following reports, selected almost at random, and coming from widely separated parts of the country, may be taken as suggestive examples of the work of the Sparrow on this crop.

From Robert D. Camp, New Haven, Conn.:

I have noticed the Sparrows eating grapes more than any other fruit. A vine within sight of my place of business is almost alive with the birds when the fruit is ripening. (April, 1887. Present fifteen or twenty years.)

From F. S. Platt, seedsman and florist, New Haven, Conn.:

Last year, when I had a large crop of very fine grapes, I found that the Sparrows were destroying nearly all of them. I watched these birds and found that they would pick out a fine bunch of fruit and pick a hole in nearly every grape. This hole would be so very small that at first it would not be noticeable, but very soon the place would begin to decay, and then the grape would be ruined. I have twenty varieties of choice grapes, which they peck and ruin

From William Holmead, Mount Pleasant, D. C. (suburb of Washington):

The Sparrows for the last two years have destroyed my grapes to such an extent that I have not realized the expenses of culture. (November 8, 1886. Present about fourteen years.)

From August Gierschner, New Athens, Saint Clair County, Ill.:

It eats cherries, plums, and grapes as long as it can find any. * * * I think public sentiment will turn against him, especially on account of the havoc he makes with cherries and grapes. (October 5, 1886. Present about fourteen years.)

From the postmaster at Bowling Green, Warren County, Ky.:

In this city it has ruined the grape crop almost wholly where unprotected. (October 3, 1886. Present about eight years.)

From Thomas S. Kennedy, Crescent Hill, Jefferson County, Ky.:

It eats ripe strawberries, raspberries, and grapes. The last season it has been unusually destructive and has torn the paper bags from the bunches of grapes It also eats holes in apples and pears hanging on the trees. (October 5, 1886. Present five or six years.)

From H. H. Miller and other members of the County Farmers' Club, Sandy Spring, Montgomery County, Md.:

It injures strawberries, * * * and particularly grapes, some of the smaller vineyards being nearly a failure on this account. (February 16, 1887. Present about eight years.)

From E. A. Bowen, Middleborough, Mass.:

It is especially fond of grapes, and destroys a great many in my locality. (September 21, 1886. Present ten or eleven years.)

From Samuel S. Lacey, Marshall, Calhoun County, Mich.:

It steals peas and eats Delaware and winter grapes. (November 20, 1886. Present about six years.)

From David C. Voorhees, Blawenburgh, Somerset County, N. J.:

It attacks and devours grapes greedily. My crop was damaged 10 per cent. this year. It seems to hunt up all the largest and best clusters, and when fully ripe does great damage by biting through the skin. (December, 1885.) It destroys grapes by the ton and peas to a great extent. (August, 1886. Present about three years.)

From Samuel N. Rhoads, Haddonfield, Camden County, N. J.:

It injures the grape and cherry most. The injury to the former is often great, and the more provoking because the Sparrow only tastes the finest of fine bunches. (September 9, 1886. Present about twenty-eight years.)

From Dr. George J. Fisher, Sing Sing, N. Y.:

They eat large quantities of our best grapes. (March 18, 1887. Present about twenty years.)

From William F. Doertenbach, Cleveland, Ohio:

On September 14, 1886, I saw a flock of about 150 Sparrows in a vineyard, and the owner said they did a great deal of damage to the grapes by pecking holes in them, making many unfit for market. (November 8, 1886. Present about thirteen years.)

From W. B. Hall, Wakeman, Huron County, Ohio:

It feeds upon the grape, puncturing the skin in the same manner as the Oriole, and thus giving bees a chance to work on the pulp. (December 24, 1886. Present about five years.)

From W. N. Irwin, South Salem, Ross County, Ohio:

After the wheat was out of their reach they commenced work on our Seckel pears, then on the Bartletts, and then on the grapes.

They only worked on one side of the pears, but took pulp and seed of the grapes, leaving the skins hanging on the vine. They seemed to like the Venango or Miner's seedling best of all, and the Delaware next, though they even cleared up the wild frost-grapes in the woods. (December 26, 1887.)

From W. B. K. Johnson, Allentown, Pa.:

I discovered this last fall that the English Sparrow takes ripened grapes. A flock of three hundred or four hundred Sparrows came into my vineyard for several days. One day I saw one cut a grape, and upon examination I found that at least half a ton were ruined. The Sparrows made a cut in each grape about three-eighths of an inch long, seemingly to get a little juice, going thus from one berry to another until whole vines were ruined, always preferring thin-skinned and sweetest varieties. (February 7, 1888.)

From Witmer Stone, Germantown, Pa.:

It frequently despoils whole grape vines of their fruit, and hacks and pecks the bunches so that they have to be protected by paper bags. (November 9, 1886. Present twenty years or more.)

From Dr. B. H. Warren, State Ornithologist, West Chester, Chester County, Pa.:

It consumes grapes, strawberries, raspberries, and blackberries. * * * The variety of grape known commonly as the Concord, in West Chester and vicinity, is particularly subject to the ravages of the Sparrow. Mr. Samuel Hannum, of West Chester, a thoroughly reliable and close observer, says: "The Sparrows destroy a large proportion of my Concord grape crop by attacking the fruit and destroying the seeds." (January, 1887.)

The testimony on this subject which comes from Australia, and which is printed in full in another part of the Bulletin, should be carefully read. It is sufficient here to state that in the vicinity of Adelaide, South Australia, where the English Sparrow has become very abundant, it is almost impossible to raise grapes. One fruit grower says: "In the worst parts of their haunts the grapes were literally cleared from the vines."

Another says that he has "a trellis of vines eighty feet in length, besides other vines, and was not able to cut a bunch of grapes," while still another lost a ton and a half of grapes in ten days.

INJURY TO OTHER SMALL FRUITS.

As already stated, very few garden fruits escape the Sparrow's notice, and almost all small fruits suffer badly. Next to grapes probably cherries are most seriously injured, but as this is a crop which suffers much from other birds, it is often difficult to say what proportion of the damage is done by the Sparrow, except in localities where there are no other birds. As cherry buds and blossoms are a favorite food of the Sparrow earlier in the season, this damage to the ripening fruit is all the more keenly felt. The following are a few of the scores of complaints received at the Department:

From J. Percy Moore, Philadelphia, Pa.:

It destroys large quantities of ripe cherries as long as this fruit can be found. June 17, 1886, I saw old birds feeding on them, and also carrying large numbers to their young in the nest. (September 7, 1886. Present about twenty years.)

From F. W. Seaver, Aaron, Switzerland County, Ind.:

I have noticed droves of them in cherry and other small fruit trees, which they would almost strip of fruit. (October 8, 1886. Present about four years.)

From John T. Mack, Sandusky, Ohio:

It ruins much ripening fruit here of nearly all kinds, especially cherries, plums, etc. (September 1, 1886. Present several years.)

From H. Volkening, Lenzburgh, St. Clair County, Ill.:

This year it allowed hardly any of our cherries or grapes to get ripe. (October 4, 1886. Present about three years.)

From W. J. N. Osterhaut, Providence, R. I.:

In a yard near my house there are two cherry trees, and in the same yard is a large bird-house which the landlord will not suffer to be removed. For several years the tenants have been able to get but very few cherries because the Sparrows devour both blossom and fruit. (April, 1886.)

Strawberries, blackberries, and raspberries also suffer considerably, as seen from the following reports:

From the postmaster at Charlestown, Clark County, Ind.:

It injures both bloom and fruit of the strawberry. (October 13, 1886. Present about twelve years.)

From Charles W. Snyder, Hudson, Columbia County, N. Y.:

I have noticed in some localities that fields of strawberries and raspberries have been injured by them to a considerable extent. (December 6, 1886. Present about six years.)

From George H. Berry, North Livermore, Androscoggin County, Me.:

They have settled in flocks on strawberry beds, currant bushes, and cherry trees, in some instances completely stripping them of fruit. (August 23, 1886. Present about three years.

From George B. Holmes, Fernwood, Cook County, Ill.:

Strawberries, raspberries, and blackberries have suffered among my neighbors, and cherries have also been damaged.

From A. Ford, Bronson, Bourbon County, Kans.:

It destroys berries and all other small fruits. It will clean out a blackberry patch very quickly. They come into a garden by hundreds, and in a few days you have no cherries or other fruit. (October 11, 1886. Present about two years.)

From J. Leonardson, New Haven, Macomb County, Mich.:

It eats grapes and black-caps. The latter suffer most in this locality, gardeners losing one-third of their crop. (Autumn, 1885.)

INJURY TO APPLES, PEARS, PEACHES, AND OTHER FRUITS.

After once getting a taste of fruit it seems that they sometimes prefer it even to grain, or at least add large quantities of it to their other food.

Mr. Jabez Webster, nurseryman and fruit-grower, of Centralia, Marion County, Ill., writes:

I have seen flocks of fifty or more stay about my raspberries, constantly flying backwards and forwards, taking quarts of the best fruit, and coming very close to the pickers. * * * Last year I observed that after they had feasted on my strawberries, raspberries, ripe gooseberries, and cherries, they were all at once flying from a stubble-field close by and alighting in my early apple trees. I thought I would see what they were after, thinking it might possibly be insects, but, alas, they were pecking holes in some ripe apples on the very tops of the trees. Some *Cornell's Fancy* and *Red June* were from one-fourth to one-third eaten, and the foliage and limbs in the tops of the trees were white with their excrement. This they kept up for several days, pecking holes only in the very ripest apples. (December 21, 1886. Present about seven years.)

From a score of reports of injury to apples we select the following:

From A. B. Ghere, Frankfort, Clinton County, Ind.:

I have seen them in large numbers feeding on small fruit * * * and pecking early apples. (August 27, 1886. Present about eight years.)

From Bell Irwin, Bad Axe, Huron County, Mich.:

The plums and apples in my own garden were attacked by it and somewhat injured. (September 15, 1886. Present about four years.)

The following detailed account of injury to apples comes from Mr. F. M. Webster, of La Fayette, Ind., who watched the birds carefully at their work, and testifies only what he has actually seen. Under date of August 25, 1886, he wrote:

The English Sparrow is destroying my apples. I have several trees in my garden, and as soon as the fruit gets mellow they peck holes in it, and it either drops to the ground or decays on the trees. I can hardly get a single apple fit to eat; they have destroyed nearly, if not quite, three-quarters of this variety. A neighbor across the way is troubled in the same manner.

In reply to a request for further information, Mr. Webster wrote:

I am not able to state now whether they show any preference as to flavor, for only one variety of my fruit is as yet ripe enough to tempt them; but they almost invariably select the largest and best apples, either because they are fastidious, or perhaps because they can better stand upon them while at work. I do not think they attack the apples in order to get the seeds, as if that were the case, it seems to me they would confine their efforts to one or two punctures, whereas they often excavate several very shallow cavities, and these are often of considerable area.

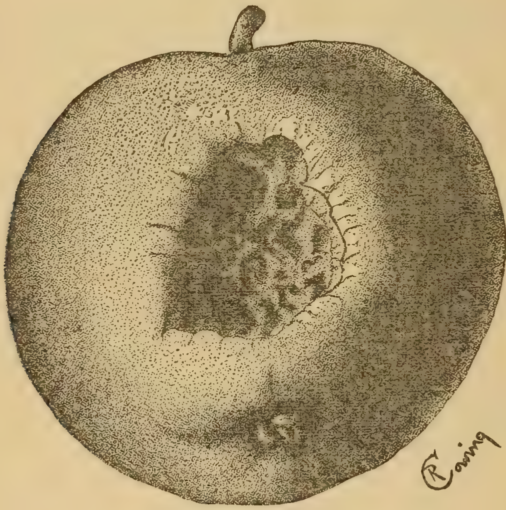
On October 7, 1886, he wrote again:

I mail to-day more samples of Sparrow-pecked apples, taken from the tree this forenoon. They are of a different variety from those sent before, and as a rule less of the pulp is taken than with the other variety, but the Sparrows begin work as soon as the apples get mellow, and I seldom get one intact. I have in my garden one more tree, of a still later variety, now loaded with fruit, as yet untouched, which I shall watch with some interest.

And finally, on the 18th of October:

The recent high winds took all the apples off the trees, except from the one of which I wrote, and yesterday I found the work of the Sparrows in the fruit of that tree also, and send you samples.

An apple pecked as above described and kindly sent to the Department by Mr. Webster is figured in the accompanying cut.



Apple pecked by English Sparrows.

[From garden of F. M. Webster, La Fayette, Ind., October 7, 1886.]

Peaches, pears, and plums are also attacked frequently, as the following statements show:

From J. A. Dakin, Tully, Onondaga County, N. Y.:

I have myself observed it destroying grapes and pears, and a farmer told me this morning that it had destroyed $10 worth of his Bartlett pears. (September 10, 1886. Present about eighteen years.)

From J. M. Dresser, La Fayette, Tippecanoe County, Ind.:

It pecks into apples and pears. (December 11, 1886. Present about twelve years.)

From John B. Tolman, Lynn, Mass.:

It injures fruit particularly. My choicest pears, peaches, grapes, and small fruits are badly pecked and mangled. (February 15, 1884.)

From Adolph Leue, Cincinnati, Ohio:

If pears are allowed to ripen on the tree it will eat them all. (October 12, 1886. Present more than twelve years.)

From L. E. Bentley, Donaldsonville, Ascension Parish, La.:

It is very fond of plums, and particularly of the *Mespilus*, or Japan plum [Loquat], which it devours with evident relish. (October 30, 1886. Present about five years.)

Many other fruits also are damaged to a greater or less extent, and a few examples are inserted here:

From William B. Berthoud, Barataria, Jefferson Parish, La.:

It is very fond of grapes and figs, and destroys a considerable quantity of these fruits. (June 27, 1887. Present about four years.)

From Dr. G. E. Manigault, Charleston, S. C.:

It attacks garden fruits and vegetables, eating grapes, figs, etc. (August 24, 1884.)

From H. Jacobson, Redwood City, San Mateo County, Cal.:

It feeds on grapes and figs. (October 11, 1886. Present twelve years.)

From W. C. Percy, jr., Black Hawk, Concordia Parish, La.:

They destroy more tomatoes * * * than any other bird. (September 15, 1886. Present two or three years.)

From W. H. Wherritt, Lancaster, Garrard County, Ky.:

It injures tomatoes and small fruits. (October 11, 1886. Present eight or nine years.)

From J. B. McKinney, Newburgh, Warrick County, Ind.:

It destroys cherries, currants, apples, pears, and any small fruit. (October 8, 1886. Present about twelve years.)

From P. W. Parmelee, Burton, Geauga County, Ohio:

I have seen it at work on currants and raspberries; in fact, it will eat anything it can get when hungry. (September 1, 1886. Present about five years.)

It is not surprising that any fruit-eating bird should attack figs, and perhaps we ought not to wonder at the Sparrow's eating tomatoes, although we are not aware that any other undomesticated bird touches them, but when we find that even currants are eaten in considerable quantities we begin to realize that the Sparrow's palate is peculiar and that no fruit whatever can be considered safe in its vicinity.

From the 288 more or less favorable reports relating to fruit we select a few of the most definite.

As these are all negative reports their value depends altogether on the opportunities for observation which each witness has enjoyed and on the manner in which these opportunities have been used.

In all except a very few cases lack of time or opportunity will account for the failure to note anything but favorable characteristics in the Sparrow, yet there are enough of these exceptions to make it tolerably certain that the Sparrows have not abused their hospitality in all cases, and we are glad to give even this devil his due.

Mr. Lewis H. Hill, of Lockport, Niagara County, N. Y., writes:

I have never known it to trouble any kind of fruit, and I have quite a variety. (September 3, 1886.)

Mr. R. G. Morris, of Georgetown, Quitman County, Ga., writes:

I do not think it injures garden fruits or vegetables. I have had a very good garden this year, and the Sparrows stay about it nearly all the time. (September 28, 1886. Present one year.)

Mr. A. F. Hofer, of McGregor, Clayton County, Iowa, writes:

It never injures fruits. I have seen it [at Dubuque ?] rearing its young broods on pear trees with the nests surrounded by the finest ripe fruit, but they never touched the pears. (October 11, 1886.)

Hon. Robert B. Roosevelt, of New York City, writes:

The robin takes every cherry our few trees produce at my place [on Long Island], but the Sparrow has never been known to steal a single one. (August 8, 1886.)

Mr. Thomas Chalmers, of Holyoke, Hampden County, Mass., writes:

I have not known it to injure fruit or vegetables. One robin and one Baltimore oriole will destroy more cherries and green peas in a day than the whole Sparrow creation in an eternity. (March 6, 1884. Present about fifteen years.)

Mr. L. H. Glover, of Cassopolis, Cass County, Mich., writes:

It does not injure fruits or vegetables. It is thought by some that our immense crop of fruit is due to its presence. (October 13, 1886. Present four or five years.)

Perhaps a half dozen equally favorable reports have been received, and they will be found scattered through the testimony on this subject. There have also been received quite a number of reports favorable in the main, but not so unqualified in their support of the Sparrow, and of which the following are fair examples:

From G. W. Warwick, of Smithville, Lee County, Ga.:

No well-sustained facts have shown it to be injurious to fruits or vegetables. I have watched it for the past year, and have a favorable opinion of it. It is not so bad on garden seed as the brown sparrow, and does little or no injury to strawberries. (September 25, 1886. Present about five years.)

From Henry C. Hallowell, Sandy Spring, Montgomery County, Md.:

It has not injured fruit here, so far as observed. We can certainly say we have never had a greater abundance of cherries, currants, gooseberries, pears, etc., than since the Sparrow came, and we have not missed the fruit which he has taken. (July 7, 1883, and August 30, 1884. Present three or four years.)

From William Rotch Wister, Germantown, Pa.:

I have not observed it to feed upon grapes or other fruit to an extent worthy of notice. (March, 1886.) It eats a little fruit, but not a small fraction of the amount eaten by robins, grackles, and other birds. (November 30, 1886. Present twenty years or more.)

From W. H. Ragan, Greencastle, Putnam County, Ind.:

They may possibly injure fruits and vegetables. They are accused of damaging the blossoms of legumes, but having carefully observed, I am unable to say that they do. I have never detected them eating berries, but have in eating dry peas and other seeds. (September 28, 1886. Present about fourteen years.)

INJURY TO GARDEN VEGETABLES.

It will be convenient to consider the injuries to vegetables under two heads: (*a*) Injury to garden plants themselves, from time of sprouting until maturity; (*b*) Injury to garden seeds.

GREEN VEGETABLES.

The information collected by the Department, as well as that already published, shows that the Sparrow does a great deal of mischief in gardens aside from that done to fruit. In every stage of growth, from the planting of the seed until another crop of seed is gathered, most vegetables are more or less subject to its attacks, some suffering most at one particular stage of growth, while others are attacked continuously. Peas, corn, lettuce, and cabbage are the vegetables which appear to suffer most while in the green state, but the two latter also suffer very much when ripening their seed.

Destruction of peas.—The following testimony shows the Sparrow's methods in relation to peas:

From Henry D. Emery, Chicago, Ill.:

They attack and destroy peas as they appear above ground. (December 6, 1884.)

From Thomas H. Shoemaker, Philadelphia, Pa.:

Many have found it almost impossible to raise peas, as the Sparrow eats them off as fast as they appear above ground. (May 25, 1884.)

From P. D. Miller, Schoolcraft, Kalamazoo County, Mich.:

Village.—I know persons who had to give up their pea crop this year on account of the Sparrow. (October 11, 1886. Present about nine years.)

From Dr. A. K. Fisher, Sing Sing, N. Y.:

People living in the village, and who have small vegetable gardens, complain bitterly of their inability to raise peas, on account of the depredations of the Sparrow. The Sparrow attacks the plants as soon as they appear above ground, and again from the time the pods are forming until they are matured. (1885. Present about nineteen years.)

From S. T. Holbrook, Norwich, Conn.:

I have seen them eating the leaves of young peas and have seen them feed their young with them. I have also seen them eating the leaves of young lettuce. (August 26, 1886. Present twenty or twenty-five years.)

From E. R. Quellin, Clayton, Barbour County, Ala.:

It comes into the garden in flocks, eating the peas and other tender vegetables. (October 20, 1886. Present about three years.)

From J. C. Swetland, Sparta, Morrow County, Ohio:

It attacks peas when in bloom, in some gardens destroying one-fourth of the crop. (October 18, 1886. Present about three years.)

From B. L. Swetland, Mount Vernon, Knox County, Ohio:

I have seen them feeding their young on the blossoms of my peas. I am satisfied that we have lost at least one-third of our crop in this way, and they destroy other blossoms. (November 15, 1886. Present about ten years.)

From Joseph C. Ratliff, Richmond, Ind.:

I saw several killed while picking out and eating peas in a garden, and on examination found the peas in their crops. (November 5, 1886. Present about seventeen years).

Much additional testimony on this head will be found in its proper place in another part of this Bulletin, and it may be remarked that complaints of injury to peas have come from every part of the world where the Sparrow has been introduced, as well as from those countries of which it is a native. The fact that no other bird is known to pull up young peas would prevent any possibility of mistake as to the author of the damage, even if the real culprit had not been caught in the act so frequently. Some few other birds do take green peas from the pod, but in most cases these birds are very scarce wherever Sparrows are abundant.

Destruction of garden corn.—Turning now to the subject of the destruction of corn (maize), we find that the evidence is equally strong, and almost as abundant. It is true that the Sparrow does not so frequently pull up the young plant, but the injury to the grain when "in the milk" fully makes up for all previous neglect.

W. C. Clapp, of Dorchester, Suffolk County, Mass., writes:

> He is caught pulling the sprouting sweet corn, flocks of them alighting in the patch and taking almost every kernel, or the tender shoot.

Henry Stewart, of Hackensack, N. J., writes:

> It attacks sweet and field corn, tearing open the husk. (February 5, 1884. Present about fourteen years.

John H. Sage, of Portland, Middlesex County, Conn., writes:

> It is quite destructive to sweet corn in the garden, stripping the husks and eating the kernels. (August 16, 1886. Present about seventeen years.)

Dr. A. P. Sharp, of Baltimore, Md., says:

> During the corn season they are very destructive to the silk and top grains, often ruining the whole ear. (February 16, 1887.)

R. H. George, of Simpsonville, Shelby County, Ky., says:

> It will often tear the shucks from the ends of the ears of garden corn, and eat several inches of green corn or matured grain. (October 15, 1886. Present about seven years.)

G. W. Daugherty, of Carmichaels, Greene County, Pa., says:

> As regards garden fruits and vegetables, our gardeners report them an intolerable nuisance. They are especially destructive to early sweet-corn, tearing it open on the stalk and eating the end, making it unfit for market and causing it to mold. (February 21, 1887. Present six or seven years.)

William Holmead, of Mount Pleasant, D. C., (suburb of Washington) says:

> Sugar and field corn when green are very much damaged by them. They tear the ends of the ears and eat the corn in the same manner as crows. (November 8, 1886. Present about fourteen years.)

The postmaster at Blaine, Pottawatomie County, Kans., says:

> Sweet-corn has been injured very much; it has been picked off while in the milk, and the husk pulled off as if done by hand. (October 6, 1886. Present seven or eight years.)

More than a dozen similar reports have been received in regard to garden corn, and three times that number in regard to field corn.

These latter reports will be found under the head of "injury to grain crops."

Destruction of lettuce, cabbage, and other vegetables.—Scores of complaints of injury to the sprouts, young plants, buds, and tender shoots of other vegetables than corn and peas have been received, but we have room here for only a few.

Mrs. G. S. F. Stoddard, of South Woodstock, Windham County, Conn., writes:

It injures fruits and vegetables. I have known it to destroy a bed of early lettuce. (January 22, 1887.)

Davison Greenawalt, of Chambersburgh, Franklin County, Pa., writes:

It picks off lettuce when quite small; cabbage, cauliflower, and radish are eaten in the seed-leaf. (September 5, 1886. Present about fourteen years.)

Simeon Zellars, of Palmetto, Campbell County, Ga., writes:

It only eats off small plants when they first come up and are quite tender. (October 4, 1886. Present about four years.)

Dr. William Weber, of Evansville, Ind., writes:

They can do great injury to young vegetables, such as lettuce, peas, cabbage, etc. They clean out beds of young plants if the latter are not protected by twigs or branches. (October 15, 1886. Present about thirteen years.)

E. B. Engle, of Waynesborough, Franklin County, Pa., writes:

It eats early cabbage-plants, peas, lettuce, and other early garden plants. (August 30, 1886. Present six or eight years.)

Ruth C. Burton, of Taylorsville, Spencer County, Ky., writes:

It is very destructive to young cabbage-plants, etc. (October 30, 1886. Present six or eight years.)

Dr. H. D. Moore, of New Lexington, Somerset County, Pa., writes:

They destroyed much of the cabbage crop of a neighbor by eating out the tender heart leaves. (September 13, 1886. Present about eleven years.)

Herman Koerner, of Birdseye, Dubois County, Ind., writes:

They ate up or ruined all that the worms left me of a large patch of cabbage. (October 7, 1886. Present about three years.)

George M. Neese, of New Market, Shenandoah County, Va., writes:

This summer I saw it eat the leaves of young cabbages after they were set, and also beets and peas. It not only eats the leaves of peas but picks off the tender shoots. (August 27, 1886. Present about twelve years.)

J. Sparks, of Vanceburgh, Lewis County, Ky., writes:

It destroys turnips and peas, eating them off to the ground. (October 20, 1886. Present about seven years.)

Prof. D. E. Lantz, of Manhattan, Kans., writes:

It eats tender vegetables when quite young. (September 27, 1886. Present about six years.)

J. T. Bodkin, of Patriot, Switzerland County, Ind., writes:

It is injurious to fruits and vegetables, especially the latter. Last year it ate up my young peas completely, and also preyed on lettuce, beets, strawberries, etc., while young and tender. (May 24, 1887. Present about three years.)

E. Odlum, of Pembroke, Ontario, Canada, writes:

They are a positive injury to gardens, both flower and vegetable. They eat almost all kinds of seeds, even the common peas. They attack small shoots of many kinds just coming above the ground, taking nearly every fleshy or pulpy sprout. We have been forced to cover parts of our garden against them. They almost destroyed our entire plat of sweet peas. (August 25, 1886. Present about twelve years.)

B. F. Maxon, of Westerly, R. I., writes:

It eats pea and pepper blossoms, young seed pods of turnips, cabbage, beet, and lettuce, and young tender corn-silk. It also eats into the ends of the ears of green corn, and eats young beet and lettuce plants. (March, 1887. Present about thirteen years.)

Dr. M. C. O'Toole, of Berkeley, Cal., writes:

It has no taste for green vegetables, carrots, parsnips, etc., but will eat them when more agreeable matter is not to be found. (February 17, 1887. Present about three years.)

Thos. Hardeman, of Macon, Ga., writes:

It feeds upon sunflower seed and green herbs, and plucks to some extent the flowers of the squash, cucumber, etc. (October 11, 1886. Present ten to fifteen years.)

Dr. E. Sterling, of Cleveland, Ohio, writes:

Last summer I was shown by a gardener a hundred tuberose plants, the buds on every one of which had been eaten out by the Sparrow. (February 25, 1884.)

GARDEN SEEDS.

The injury to garden seeds is hardly so severe as might be expected in view of the fact that the Sparrow is so destructive to green vegetables, and that his natural food is seed. Nevertheless, a reference to the summary of evidence on this point shows that the injuries are far from insignificant.

Not infrequently the Sparrow scratches up seeds of various kinds, and especially such as are sown broadcast and imperfectly covered. The following examples serve to illustrate this point:

From Aug. Barthel, Belleville, Saint Clair County, Ill.:

It destroys all seeds sown in the garden, and if prevented from eating them, it eats lettuce, spinach, etc. It also eats the vines of peas, etc. (September 2, 1886. Present many years.)

From H. Harris, Union Springs, Bullock County, Ala.:

It will scratch up seed when first planted; it is as bad as if you were to turn into a newly planted garden 50 chickens. What it does not eat when it is planted is finished after it goes to seed. (September 17 and 24, 1886. Present about six years.)

From J. W. Johnson, Meriwether, Edgefield County, S. C.:

It will scratch for garden seeds as soon as they are planted. (August 24, 1886. Present five years.)

From Edward T. Keim, Dubuque, Iowa:

In one case grass seed was planted on a lawn, and troops of Sparrows devoured every seed. (August 19, 1886. Present about ten years.)

Many similar instances will be found under the head of injury to grain. But the destruction of seed when ripening is an injury of still greater importance.

Destruction of Seed of Lettuce, Cabbage, and Turnip.—A majority of the complaints relate to the seeds of lettuce, turnip, and cabbage, and the combined losses from injuries to the seeds and young plants of these three vegetables are often very serious, as will appear from a glance at the following examples taken from the abundant evidence on this question:

From H. Volkening, Lenzburgh, Saint Clair County, Ill.:

It ruins cabbage and other vegetables planted for seed. (October 4, 1886. Present about three years.)

From Pat. W. Floyd, Burlington, Coffey County, Kansas:

I have observed lettuce entirely stripped of the seed; and through dissection of specimens taken in the vicinity, have found the food to be almost entirely vegetable. (October 12, 1886. Present three or four years.)

From Thomas Shroyer, Preston, Hamilton County, Ohio:

It is only by careful watching that the country gardener can save seeds of any vegetables or flowers. (September 23, 1886. Present about eleven years.)

From Elisha Slade, Somerset, Bristol County, Mass.:

The destruction of the seeds of vegetables and flowers is enormous. It is begun before they are ripe, almost as soon as they are formed, and continues through the season. Often it is impossible to save the seeds from these birds unless the plants are covered by netting. (October 19, 1885.)

The seed of cabbage, turnip, carrot, lettuce, etc., is attacked before it is ripe enough to be gathered. (August 20, 1886. Present about twelve years.)

From H. M. Jennings, gardener and seedsman, Rochester, N. Y.:

Some kinds of seed it is next to impossible to grow; for example, lettuce, cabbage, and turnip. * * * The Sparrows get into our dry-houses and peck and destroy if not kept away. (February 12, 1887. Present twelve years.)

From F. S. Platt, seedsman and florist, New Haven, Conn.:

They destroy many hundreds of dollars worth of seeds each year. (1884.)

In our seed-gardens we have to keep a boy all the time during the day to keep the Sparrows from wasting turnip, cabbage, and seeds of this class. (September 9, 1886.)

From Thomas Chalmers, Holyoke, Hampden County, Mass.:

The Sparrow eats the seeds of the turnip, cabbage, rape, flax, and hemp, as well as the seeds of weeds and grasses, cultivated or wild. (March 6, 1884. Present about fifteen years.)

From W. A. Wright, Burlington, Carroll County, Ind.:

Peas, and the seed of radish, beet, and cabbage, are the principal vegetables on which it feeds in June and July, and sunflower seed later on. (September 21, 1886. Present sixteen years or more.)

From J. C. Allen, Olney, Richmond County, Ill.:

It strips the sunflower and hemp of all their seed. (September, 1886. Present about twelve years.)

Destruction of Sunflower Seed.—The complaints of injury to sunflower seed outnumber those relating to any other single kind of garden seed, and where Sparrows are abundant such seed can not profitably be raised. Following are a few reports bearing on this subject:

Col. Randolph Harrison, of Richmond, Va., writes:

> The greatest pest which our sunflower had was the English Sparrow, which devoured the seed as fast as it matured. (October, 1887.)

W. T. Cunningham, of Danville, Vermillion County, Ill., writes:

> It takes all sunflower seed that is not protected. (September 4, 1886. Present about ten years.)

S. R. Ingersoll, of Cleveland, Ohio, writes:

> To growers of sunflower seed it is very troublesome, eating nearly all the seed. (September 1, 1886. Present about fourteen years.)

Fred. Mather, of Cold Spring Harbor, Suffolk County, N. Y., writes:

> The yellow-bird and the English Sparrow eat up a big share of the sunflower seed which I raise for my fowls. (February 17, 1887.)

H. C. Hull, of Meriden, Conn., writes:

> I had about one hundred sunflowers, and the Sparrows devoured the seed in about two days. (August 31, 1886. Present sixteen years.)

Aside from purely negative statements, unsupported by evidence of any kind, very few reports favorable to the Sparrow on this question have been received. The usual number report "no injury to seeds observed;" varied occasionally to "little injury noted," or "no damage of any account."

More rarely a definite and favorable reply has been received. The five following reports may be taken as fair samples of the evidence favorable to the Sparrow as regards vegetables and garden seeds:

From John T. M. Hairn, Lexington, Oglethorpe County, Ga.:

> I have watched its habits closely and know that it does not injure fruits or vegetables. It picks up *from the ground* any seed, such as clover or cabbage, but does not unearth any seed, or take it out of the head. (September 25, 1886. Present about four years.)

From M. M. Murphy, Ripley, Brown County, Ohio:

> I have never found them any detriment to my garden. (November 12, 1886. Present about ten years.)

From Judge John C. Ferriss, Nashville, Tenn.:

> It is a blessing to any community that raises vegetables. (November 12, 1886. Present about eight years.)

From John D. Hicks, Old Westbury, Queens County, N. Y.:

> It does not injure garden fruits and vegetables with us, except that it occasionally picks out and eats the ends of some sweet corn in the garden, thus in a small way injuring the ear. (August 16, 1884.)

From A. V. Coffin, Le Roy, Coffey County, Kans.:

> I have not observed any injury to fruits or vegetables by the Sparrow. It has been of service by eating the seeds of the native sunflower, but it also eats the seed of lettuce, flax, and artichoke. (October 8, 1886. Present about two years.)

Destruction of Weed Seed and Grass Seed.—This last example suggests a point which has been more frequently urged in favor of the Sparrow in the Old World than in the United States, namely, the service done by consuming the seeds of weeds. There can be no question that the bird does eat many weed seeds, but it is very questionable if this is in reality of any considerable consequence. It is impossible to define the term weed perfectly. A weed is simply a plant out of place. Almost any useful plant may become a weed if it grows in the wrong place, and conversely almost any weed may be valued as a garden plant under some circumstances. Our various grasses, native and introduced, are valuable plants in their proper places, but become troublesome weeds when they grow unbidden in our gardens. The Sparrow eats the seeds of such grasses wherever and whenever he finds them, and the act is good, bad, or indifferent according to circumstances. In the field or by the roadside this habit is of little account either way and in the garden but few grasses are allowed to ripen seed; if they did, however, and the Sparrow destroyed it all, most grasses would still spread by the root. Moreover, the Sparrow destroys many useful seeds as well.

The Sparrow is an unquestionable nuisance in eating grass seed when sown on lawns and about houses, frequently scratching it up, or plucking and eating the tender sprouts as they come through the ground.

Mr. William Saunders, superintendent of the garden and grounds of the Department of Agriculture, at Washington, D. C., testifies:

> It is very difficult to start grass anywhere about the grounds, as the Sparrows eat the seed as fast as sown.

Similar trouble has been experienced in the Smithsonian grounds and elsewhere in Washington, as well as in other cities where Sparrows are abundant. The dissection of Sparrows has established the fact that they eat almost every kind of seed obtainable, though certain kinds are always preferred if there is a choice. Among vegetables we have seen already that cabbage, turnip, and lettuce are preferred, and that sunflower seed is a special favorite. Among grains, wheat seems to be preferred above everything else, and oats stand next in favor. Among grasses, those with large seeds are preferred, and the fox-tailed grasses (*Setaria*), so closely allied to millet or Hungarian grass, are much sought after.

Among weeds, the genus *Polygonum*, including the bind weeds (and also the buckwheat), heads the list, and as some species of this genus are sure to be found in almost every unoccupied city square or waste place in the outskirts of the city, the seed forms a pretty constant factor in the Sparrow's food in summer and autumn.

Out of 522 stomachs of English Sparrows examined at the Department of Agriculture during the past summer (1887), 102 contained grass seed and 85 contained weed seed. In nearly all cases where many Sparrows have been dissected in summer and fall, considerable quantities of weed seed have been found. And yet it is very probable that in ninety-nine out of every hundred cases in which such seed had been eaten no particular benefit had been conferred on anyone, the seed being mainly from roadsides and waste places, so that its consumption did neither good nor harm, except in so far as it served to divert the attention of the Sparrow and prevent it satisfying itself with other and perhaps more valuable food.

INJURY TO GRAIN.

In reply to the question relating to injury to grain crops, 750 answers have been received, of which number 183 are favorable to the Sparrow, 562 are unfavorable, and 5 are of mixed character.

Although the question called specifically for information as to *grain crops*, it is probable that some replies refer only to the consumption of scattered grain, and not to the grain in the field or stack; but as such information naturally has a direct bearing on the latter question, most of this evidence has been summarized, omitting only such parts as refer solely to the consumption of waste grain in the streets, this latter point having been fully discussed already in its bearings upon the increase and spread of the Sparrow.

The reports submitted came from 31 States, the Territory of Utah, the District of Columbia, and the Dominion of Canada.

The States sending the largest number of reports were:

States.	Favorable.	Unfavorable.	States.	Favorable.	Unfavorable.
Michigan	20	65	Pennsylvania	7	28
Ohio	8	62	Georgia	15	21
Indiana	5	54	Iowa	13	10
New York	12	51	Massachusetts	6	16
Kentucky	22	29	New Jersey	3	17
Illinois	24	29	Kansas	6	13

Canada sent 22 reports; 9 favorable, 12 unfavorable, and 1 indifferent.

The following table will give some idea of the Sparrow's preferences in regard to grain, but it should be remembered that as a rule Sparrows take that which can be obtained most readily, and the fact that in some sections one kind of grain is grown to the practical exclusion of all others will account for the apparent preference of Sparrows in that region for that particular grain.

Grain injured.	No. of observers reporting.	Grain injured.	No. of observers reporting.
Wheat	275	Rice	8
Oats	107	Buckwheat	6
Rye	43	Grain or grain crops, kinds not specified	185
Barley	18	Small grain, kinds not specified	28
Indian corn	34	Cereals, kinds not specified	14
"Millet"	20	Clover or grass seed	8
Sorghum	7	Seeds, kinds not specified	12
"Millo maize" (variety of sorghum)	9		
Other varieties of sorghum	9		

INJURY TO WHEAT.

This crop suffers from the time of sowing until it is stored in the barn or elevator, and even then the Sparrows frequently find a way to get at and devour it. The period during which the greatest damage is done lasts from the time it is "in the milk" until it is threshed, but quite frequently, as the following reports show, considerable damage is done on newly sown fields.

George Wyckoff, of Mears, Oceana County, Mich., writes:

> I have heard several complaints from farmers of its working on new-sown wheat. (October 7, 1886. Present about three years.)

James P. Melzer, of Milford, Hillsborough County, N. H., writes:

> If very abundant it would consume the grain as planted. It pulls it up for a few days after it comes up. (August 28, 1886. Present about ten years.)

A. H. Mundt, of Fairbury, Livingston County, Ill., writes:

> It loves wheat grains and many other kinds which it scratches out and eats. (October 6, 1886. Present five or six years.)

Edward T. Keim, of Dubuque, Iowa, writes:

> Every seed that is not well covered is at once detected and eaten. (August 19, 1886. Present about ten years.)

Dr. A. P. Sharp, of Baltimore, Md., writes:

> Being here the year round they destroy the fall sowing of wheat and other grain, and are at work on the young grain in the spring. I have killed them in the fall up to December, and have seldom failed to find their craws full of wheat, showing that they must destroy much of the seed wheat, for I can think of no other way of getting it. I have often seen at least fifty on a shock of wheat, as they go in flocks when the young are about three-fourths grown. (February 16, 1887.)

It seems almost superfluous to cite here any instances of the destruction of wheat in the field, as the reader can turn directly to the evidence under the head of grain crops, and read page after page of the most positive proof that the Sparrow does injure wheat most seriously. The absurdity of the claim that Sparrows are confined to cities and large towns is shown over and over again by this evidence, for scores of witnesses testify to serious losses of grain on fields at a distance from any large city, although it is doubtless true that the injury is generally greatest within a radius of ten miles from a large town or city. The following examples of testimony on this point are suggestive.

From George Sibbald, of Aberdeen, Brown County, Ohio:

> My farm is so situated as to be the nearest feeding-grounds for great numbers of Sparrows, as there is a village on one side and a city in front. The Sparrows at this writing are coming by thousands to feed on the wheat. (June 10, 1887.)

From Jason E. Nichols, Lansing, Mich.:

> It leaves the city in flocks, and eats wheat as it grows in the field, and stands in the stack before threshing. (August 26, 1886.)

From George P. Lowell, of San Francisco, Cal.:

> In the fall of the year it migrates to grain fields in the immediate vic
> city. (June, 1887. Present more than ten years.)

From Dr. Daniel Berry, of Carmi, White County, Ill.:

In the town they organize foraging parties for excursions into the country. I have seen hundreds of them busy among the wheat shocks. (October 6, 1886. Present about ten years.)

From Dr. Ormsby Gray, of Shelbyville, Ky.:

As soon as the head matures it begins to visit wheat fields in large flocks and eat the grain; in fact it almost disappears from the town for two or three days at a time while foraging. (October 12, 1886. Present about eight years.)

From Robert D. Camp, of New Haven, Conn.:

I have noticed for a number of years the diminished number of Sparrows in the city during the harvesting, and upon inquiry among the neighboring farmers I find that they make their way to the country during that season. (April, 1887. Present fifteen years or more.)

From J. L. Davison, of Lockport, Niagara County, N. Y.:

I have known it to leave the city by hundreds and feed upon a wheat field adjoining Glenwood Cemetery. The estimated damage was one-fourth of the crop. (October 10, 1885.)

From Joseph C. Ratliff, of Richmond, Ind.:

It is very destructive to wheat before and after it is cut. I saw its depredations in wheat fields last summer, four or five miles out of the city. (November 5, 1886. Present about seventeen years.)

From H. F. Work, New Washington, Clark County, Ind.:

It injures grain crops, especially wheat; almost wholly destroying standing crops in the vicinity of large towns, and preying on the same in shock and stack. (April 21, 1887.)

From Dr. George L. Andrew, of La Porte, Ind.:

It has already become a pest to the grain fields in the immediate vicinity of towns. During the last wheat harvest I rode over the country around Hamilton, Ohio, and by carriage to Cincinnati, and all the fields observed had suffered for a rod or two around the edges, in many cases the grain having been "cleaned out" entirely. (September 9, 1886. Present about six years.)

William N. Ponton, of Belleville, Ont., Canada, writes:

When it can get grain it will not touch anything else. Wheat especially is its prey, and on my own farm here on the shores of the Bay of Quinte, three acres of fall wheat were absolutely eaten up by Sparrows, and by Sparrows alone. (September 27, 1884.)

The habit of working around the edges of a field seems to be characteristic of the Sparrow, and is mentioned in scores of reports. Blackbirds, rice-birds, and others which damage grain are more apt to avoid the edges of the fields and settle in the midst of the grain, where they are less likely to be disturbed, but the Sparrow scorns to seek safety in the same way, but feeds unmolested wherever he chooses.

William McBrown, of Fall River, Greenwood County, Kans., writes:

It will eat every grain of wheat or other small grain that time will permit. Along hedges I have seen wheat stripped of every grain for many feet into the field. (October 8, 1886. Present about two years.)

Jabez Webster, of Centralia, Marion County, Ill., writes:

When cloyed with raspberries they would go in flocks to a wheat field close by, and for hours fly backwards and forwards from the hedge to the field until a strip of wheat a rod wide was cleaned out. (December 21, 1886. Present about seven years.)

Dr. A. K. Fisher wrote from Ann Arbor, Mich., under date of July 2, 1887:

> Yesterday while passing a small field (about two acres) of wheat, a flock of about 500 English Sparrows flew out. I shot one and found its throat filled with the grain. I walked along by the fence, and, as nearly as I could judge, at least one-half the grain had been removed from the heads.

The two following reports are examples of testimony as to damage to wheat before it is ripe. Very many more will be found scattered through the evidence further on.

From C. S. Plumb, Geneva, Ontario County, N. Y.:

> It does great injury to wheat and oats, shelling the heads from the milk state to harvesting. It also works at the stacks, and persistently at the fields. Farmers in this portion of the State complain to me that the Sparrow is of late becoming very injurious to wheat fields. (August 28, 1886.)

From H. H. Miller and other members of County Farmers' club, Sandy Spring, Montgomery County, Md.:

> From the time the wheat is in the milk until it is thrashed, the Sparrow is in constant attendance. In barns, on the outsides of the mow and to a depth of 6 or 8 inches, not a head escapes. (February 16, 1887. Present about eight years.)

While the wheat is in the milk considerable damage is done by breaking down the stalks, in addition to the kernels actually eaten. As the grain ripens, however, far more damage is done by shaking and beating it out of the heads, so that probably much more is scattered on the ground and lost than is actually eaten.

This is equally true of some other grains, as shown by evidence given a little further on.

As the grain is cut the Sparrows frequent the stubble and pick up some scattered kernels, but they are far too knowing to waste much time on the ground so long as the shocks of grain are left standing in the field. From the abundant testimony on this score we select a few examples, and some of these show also how the Sparrow follows the grain from shock to stack and from stack to crib, causing loss to the farmer at every step.

From Prof. B. W. Evermann, Bloomington, Monroe County, Ind.:

> Near my house is a wheat field in which the wheat stood in shocks for several weeks this summer. Hundreds of Sparrows resorted to this field and fed upon the grain, so that the outside sheaves had but little left. (August 25, 1886. Present about eleven years.)

From A. B. Ghere, Frankfort, Clinton County, Ind.:

> I have seen hundreds of these birds on and around a single shock of wheat. (August 27, 1886. Present about eight years.)

From J. G. Kingsbury, Indianapolis, Ind.:

> They are destroying a great deal of wheat in this vicinity now. They bend the heads to the ground, eat part and waste the rest. After the wheat is cut they cover the shocks and eat all the heads exposed. (June 25, 1887. Present eight or ten years.)

From L. N. Bonham, Oxford, Butler County, Ohio:

I have known it to clean every grain of wheat from the cap-sheaf and exposed heads in a ten-acre field of wheat in shock. Near the village it attacks the heads before the grain is put in shock. (November 29, 1886. Present about eight years.)

From A. T. Keister, Blacksburgh, Montgomery County, Va.:

It destroyed for me alone six or eight shocks of wheat last season. (November 15, 1886. Present five years or more.)

From Davison Greenawalt, Chambersburgh, Franklin County, Pa.:

This summer I saw six acres of wheat in shock which was completely picked clean on top and sides, as far as could be reached, by the Sparrow. (September 5, 1886. Present about fourteen years.)

From Edward Burrough, Merchantville, N. J.:

Clouds of them gather in the wheat fields, and the grain for a distance of 25 feet next the fence is thrashed out and the ground coated with chaff. (September 2, 1886. Present about ten years.)

From Samuel N. Rhoades, Haddonfield, N. J.:

As the young of the first and second broods are often fully fledged by July, the united attacks of these with the parents on standing wheat are inevitable, and near towns, appalling. Should the mow or wheat stack be unthrashed, by midwinter not an exposed head has a grain in it, and the birds, like mice, will fairly burrow inside several inches for more grain. Oats in shock, and corn in crib, are also levied on heavily. (September 9, 1886. Present twenty-five or thirty years.)

From J. A. Dakin, Tully, Onondaga County, N. Y.:

I have seen large flocks tearing down wheat in the field, and oats and barley in the stack and field. In some instances several acres have been destroyed in this way. (September 10, 1886. Present about eight years.)

From U. G. Gordon, Barry, Cuyahoga County, Ohio:

The Sparrows are the worst birds we have. I have seen wheat fields and oat fields in the vicinity of Cleveland which were injured at least one-half. (September 7, 1886.)

From the postmaster at Bowling Green, Warren County, Ky.:

It has been observed to alight on shocks of grain and leave nothing but the straw. (October 3, 1886. Present about eight years.)

From T. D. Barron, Saint Clair, Mich.:

I know fields of wheat and oats which it has almost destroyed. One small wheat field within the limits of the city was one-third wasted by what was shelled out both before and after it was cut. (October 7, 1886. Present eight or ten years.)

From Ransom A. Moore, Kewaunee, Wis.:

Several in this vicinity have had their crops almost ruined by its depredations about the time the grain was ripening. (November 8, 1886. Present about two years.)

From Charles M. Clapp, Albion, Noble County, Ind.:

I have known of their picking out of the head all the grain in sight on top of shocks and stacks of both wheat and oats. (October 14, 1886. Present five or six years.)

From William Holmead, Mount Pleasant, District of Columbia (suburb of Washington):

In 1882 I had part of my farm in wheat. After cutting and shocking it the Sparrows came by thousands and destroyed every head of grain exposed; after it was stacked preparatory to thrashing, they covered the whole stack. I had to shoot at them two or three times a day to scare them away, and upon thrashing my wheat it was estimated that fully one-tenth of the crop was destroyed. One of my neighbors estimated that one-half of his wheat was eaten by the Sparrows last year. This year I had about four acres in oats. After the oats were put in the barracks the field was filled with thousands of Sparrows, and when they had cleaned the field they attacked the oats in the barracks, and I think they got every oat that was exposed. (November 8, 1886. Present about fifteen years.)

When wheat or other grain is grown in small quantities, for experimental purposes, it is liable to be severely damaged by the Sparrow, especially if planted near towns or cities. We append two or three complaints on this score from the many received:

Andrew Gray, of Willoughby, Lake County, Ohio, in a letter to Hon. Norman J. Colman, Commissioner of Agriculture, says:

This is to inform you that I drilled in the seed wheat you sent me in one corner of the field that I sowed to *Clawson*. I sowed it on rich, sandy soil and it came through the winter well and gave promise of a splendid crop, especially the *Diehl Mediterranean*, which looked the most promising, although the *Martin amber* did very well. But, alas for human hopes! About four or five days before it was ready to cut I went to see how it was getting along and found that the English Sparrows had harvested the crop. Their first choice was the *Martin amber;* the next was the *Diehl Mediterranean;* and the last the *Clawson*. I saved about a peck of seed from the two kinds. I think I can safely say that I would have got as much as one and one-half bushels of seed from the two quarts of seed sent, if the Sparrows had let it alone. They are a nuisance! They used up as much as five bushels of wheat for me this year, and as many oats. (October 25, 1886.)

William B. Alwood, of the Ohio State University, near Columbus, Ohio, writes:

It never fails to attack our wheat fields in unlimited numbers about ten days before ripening; and each year we are compelled to resort to shooting. On the plats of the experiment station many varieties of our cereals would be utterly ruined unless watched with care. The Sparrows attack indiscriminately wheat, oats, and barley, but they attack the wheat with such force and persistency that many times the heads are completely broken down over rods of space. (July 16, 1887. Present more than ten years.)

J. F. C. Hyde, of Newton Highlands, Middlesex County, Mass., writes:

It is very injurious to grain crops, taking nearly or quite all in some cases. I had a new variety of wheat which I was growing for seed, and they took every grain. (February 11, 1884.)

INJURY TO OATS.

Next to wheat the Sparrow seems to prefer oats, and numerous instances of heavy loss to this crop have been reported by our correspondents.

The following may be taken as samples of the evidence on this point:

From Dr. M. C. O'Toole, Berkeley, Cal.:

It will eat every kind of grain, and in large quantities, but wheat is injured more than oats or barley. (February 17, 1887. Present about three years.)

From Frank S. Platt, New Haven, Conn.:

> A short time ago I cradled a small piece of oats, and the Sparrows gathered on the shocks in such flocks that I shot fifty-four with one barrel and thirty-five with the other. (September 9, 1886. Present fifteen years or more.)

From Robert W. Barrell, South Bethlehem, Northampton County, Pa.:

> I once saw about an acre of oats almost entirely destroyed by the Sparrows. They also do great damage to Egyptian rice; a moderate-sized flock will destroy an acre in a season. (September 16, 1886.)

From H. B. Bailey, East Orange, Essex County, N. J.:

> It totally destroyed a field of ripe oats back of our house, so that the owner cut it down for bedding. Others tell me they have witnessed the same thing. (February 7, 1884. Present ten years or more.)

From Dr. E. Sterling, Cleveland, Ohio:

> The only instance I know of in which the Sparrows threatened serious injury to grain was on a farm where a man killed 102 of them at four shots into a small flock that was inspecting his seed oats; and the owner tells me that if he had not slaughtered and driven them off, he would not have gathered a bushel of oats from his acre and a-half. (February 25, 1884.)

From H. Volkening, Lenzburgh, Saint Clair County, Ill.:

> Farmers say the Sparrow destroys about five per cent. of the wheat, and especially oats, in the field. (October 4, 1886. Present about three years.)

From Elisha Slade, Somerset, Bristol County, Mass.:

> Bird for bird, or collectively, they are more destructive to rye, oats, barley, and Indian corn, than crows and blackbirds. The English Sparrows are enormous eaters, and so semi-domestic are they that it is not easy to scare them away from the grain fields. They cling to the shock and stack with grain-loving tenacity. (August 20, 1886. Present about twelve years.)

INJURY TO RYE AND BARLEY.

Although between forty and fifty reports of injury to rye have been received, it is evident that for some reason it is much less often attacked than either of the grains already mentioned.

The same is true, but to a still greater extent, with regard to barley, for many observers state that the Sparrow will not touch barley so long as it can get anything else. Nevertheless, there are doubtless times when these grains suffers considerably from the attacks of the Sparrow.

Hubert L. Clark, of Amherst, Mass., writes:

> It is here continually except about the time the rye crop is gathered; it then visits the fields and does much damage to the rye. (October 2, 1885.)

J. T. Bodkin, of Patriot, Switzerland County, Ind., writes:

> It works on wheat, rye, and oats, and on corn while young and tender. I have examined one or two dead ones and found their craws filled with wheat and rye. (May 24, 1887. Present about three years.)

INJURY TO FIELD CORN.

The injury to garden corn has already been spoken of, but it should be noted that the Sparrow does not confine its raids to gardens, but attacks and seriously injures field corn, especially while in the milk. The following is but a small part of the testimony on this subject, and a careful consideration of all which has been collected shows that the Sparrow threatens to be a dangerous enemy to this crop in the future.

From Dr. Fred. Sumner Smith, West Hartford, Conn.:

I can speak from observation of their raids on corn, some ears being completely stripped of kernels, the little pests husking and shelling as they went along, so that not a shock in the field escaped them. (November, 1885.)

From J. N. Bagg, West Springfield, Mass.:

It strips down green corn in the fields, sometimes one-third or more the length of the ear, and is doing so now. (September 7, 1886. Present five or six years.)

From G. W. Daugherty, Carmichael's, Greene County, Pa.:

It tears open the shucks of standing corn so as to admit the rain or wet, causing it to mold or rot. (February 21, 1887. Present six or seven years.)

From Dr. B. H. Warren, West Chester, Pa.:

They greatly damage the corn crop, tearing open the husk, devouring the tender part of the ear, and exposing the remainder to the ravages of insects and to atmospheric changes. (January, 1887.)

From Thomas Shroyer, Preston, Hamilton County, Ohio:

We have seen many fields of corn bordering its resorts, where the ears were greatly damaged while yet soft. (September 23, 1886. Present about eleven years.)

From G. C. Bunsen, West Belleville, Saint Clair County, Ill.:

I recently saw a flock in my cornfield and gave them credit for destroying grasshoppers, which they will do occasionally; on examination, however, I found they were in partnership with the latter, eating out the corn which the grasshoppers had laid bare. (Autumn, 1885.)

From T. S. Williams, Dupont, Jefferson County, Ind.:

They split the husk on corn as soon as it is in the milk, and eat and destroy large quantities of it. (October 6, 1886. Present about six years.)

INJURY TO SORGHUM.

The several varieties of sorghum are known in different parts of the country by so many different names that it is not always possible to tell just what is meant when a person complains of injury to his crop and gives the local name of the variety of grain attacked. In most cases the names Egyptian rice, Russian millet, pearl millet, chicken corn, Millo maize, etc., denote varieties of sorghum, and the Sparrow has proved very destructive to seed of this kind, wherever grown.

W. H. Wherritt, of Lancaster, Garrard County, Ky., writes:

I have known it to destroy the whole crop of sorghum seed. (October 11, 1886. Present eight or nine years.)

Ruth C. Burton, of Taylorsville, Spencer County, Ky., writes:

It injures wheat fields and the seed top of sorghum. (October 30, 1886. Present six or eight years.)

H. F. Barrell, of New Providence, Union County, N. J., writes:

A few years since I had about one-fourth of an acre of the so-called Egyptian rice destroyed by these pests. (1885. Present about twenty years.)

Lloyd McKim Garrison, of Orange, N. J., writes:

In our neighborhood grain is very little grown; a neighbor, however, has planted Russian millet for fodder and the grain of this is devoured by the Sparrows with alarming rapidity. (February 11, 1884. Present many years.)

William Saunders, superintendent of garden and grounds of the Department of Agriculture, at Washington, D. C., says:

The seed of ornamental grasses is taken as fast as it matures, and can only be saved by bagging the heads before they ripen. When experimenting with sorghum the same trouble was experienced, and some experiments failed from this cause alone. (April 13, 1887.)

Thomas Hardeman, of Macon, Ga., writes:

Millo maize and millet are not suffered to ripen their seed. (October 11, 1886. Present ten or fifteen years.)

Many other reports of injury to "millet" have been received, and probably in most cases this term is used to indicate a species of *Setaria*, also known as Hungarian grass.

Mr. E. L. Brown, of Eufaula, Barbour County, Ala., writes:

It eats millet seed before it fully matures. It is impossible to save such seed. (September 17, 1886. Present about four years.)

Mary Tuttle, of West Windsor, Eaton County, Mich., writes:

Millet fields have been quite destroyed by the Sparrow. (October 14, 1886. Present about two years.)

The late Dr. J. M. Wheaton, of Columbus, Ohio, wrote:

I have seen large flocks feeding on the seed of Hungarian grass in the autumn. (April 18, 1884. Present about twelve years.)

M. Abbott Frazar, Mount Auburn, Middlesex County, Mass., writes:

July 30 I planted about 50 square yards with Hungarian grass. Two weeks of dry weather followed and the grass did not come up. From fifty to two hundred English Sparrows camped there during all this time and busied themselves with scratching up seeds. When the grass did come up it was badly injured. (Autumn, 1885.)

INJURY TO RICE.

Wherever the Sparrow has reached the rice-growing districts he has damaged the rice to a greater or less extent, but this crop annually suffers so severely from the attacks of rice-birds and blackbirds that the presence of a few English Sparrows is often overlooked. In the Middle States the rice-bird or bobolink (*Dolichonyx oryzivorus*) feeds largely on the so-called wild rice (*Zizania aquatica*), and often the Sparrow may be found feeding in the same places.

F. T. Cuthbert, of Plainfield, N. J., writes:

It feeds extensively upon wheat, grass seed, and all the smaller grains. In the wild-rice pads it mingles with the bobolink and fattens on the rice. (February, 1887.)

Further South it has already attacked the rice-fields, although its injuries as yet have attracted little attention, except in the rice districts of Louisiana.

W. C. Percy, jr., of Black Hawk, Concordia Parish, La., writes:

During the summer of 1886 it destroyed quantities of corn, oats, and rice. It is worse on corn and oats than any other bird. (September 15, 1886. Present about two years.)

The postmaster at Edgard, Saint John Baptist Parish, La., writes:

It injures rice seed very much [in the spring], and annoys farmers very much when the crop is ready to harvest. (October 7, 1886. Present two years.)

E. J. Engman, of Concession, Plaquemines Parish, La., writes:

I can not say when the Sparrows first appeared here, but it is only within two years that we have noticed them on the rice-fields, where they come in flocks, and are more destructive than the blackbird or rice-bird Being so tame, they are very troublesome, as you can not scare them as you can the rice-bird. Last year they were very numerous during planting and harvesting. This spring I do not see as many, but they are making their appearance very fast, and every one is troubled more or less. (April 21, 1886. Present two or three years.)

The losses occasioned to rice-growers by the depredations of migratory birds are so heavy already that many planters have preferred to abandon the culture of rice rather than keep up the expensive warfare which is necessary in order to save any large proportion of the crop.

By early planting it is sometimes possible to harvest a part of the crop before the rice-birds arrive from the north, but should the English Sparrow once obtain a strong foothold in the rice districts, and increase as rapidly as he has done elsewhere, the rice-grower will be compelled to fight a species which is present the entire year, which multiplies more than twice as rapidly as any native bird, and which is so ravenous and at the same time so cunning that it can not be combatted successfully with the same means employed against the native birds.

INJURY TO BUCKWHEAT.

One other crop suffers from the Sparrow's depredations wherever it is grown. This is buckwheat, of which the bird is very fond, attacking it under almost all circumstances. As buckwheat is not grown extensively, however, we have not received any large number of complaints as yet; but the two following show that the Sparrow is true to his nature, and will not neglect his opportunities.

From A. H. Boies, Hudson, Lenawee County, Mich.:

I have seen large flocks settle on buckwheat. (August 19, 1886. Present about eleven years.)

From H. J. Gaylord, Binghamton, Broome County, N. Y.:

He destroys buckwheat while it is standing in the field. Thousands of them are in my field to-day. (September 26, 1885.)

NEGATIVE EVIDENCE.

There is no side of this grain question which can be fairly said to be favorable. The question of benefit from eating weed-seed has already been discussed, and the few reports which claim that the Sparrow does not attack grain crops under any circumstances must be entirely ruled out, or rather relegated to the category of purely negative evidence, and labeled "claims not substantiated." There remain, of course, some reports which are only mildly hostile to the Sparrow, or are even favorable as far as they go, but these need no comment except, perhaps, the statement that they are evidently honest opinions, and are entitled to respect as such. We insert a few samples, which explain themselves.

From A. P. Farnsley, per J. B. Nall, editor Farmers' Home Journal, Louisville, Ky.:

> The English Sparrow is the only bird I know to be injurious to grain crops; but if the amount he saves were weighed against that which he eats, the former would outweigh the latter many times.
>
> The trouble is, that the grain he eats and the amount he eats are seen by all, while the amount he saves the farmer is not seen. The destruction of a few insects in the wheat field during the fall or spring might increase the yield one or more bushels per acre, yet it could not be seen; but when the Sparrow takes the wheat from the bundle that lies on top of the shock it is seen by all. (August 8, 1886.)

From John Allan Terrell, Bloomfield, Nelson County, Ky.:

> It does not injure grain more than other birds. It flocks to wheat fields, but on examination I find the crop filled with grub-worms and grasshoppers. (October 6, 1886. Present about seventeen years.)

From Howard Kingsbury, Burlington, Iowa:

> All talks with farmers in this section failed to draw out any complaint of injury to grain crops. (December 28, 1886. Present sixteen or seventeen years.)

From the Davenport (Iowa) Academy of Natural Science, per W. H. Pratt, curator:

> While it eats a great deal of grain about the mills and warehouses, it does not as yet go into the fields, and has probably injured no crops here. (April 20, 1887. Present about seventeen years.)

RELATION OF THE SPARROW TO OTHER BIRDS.

This is one of the most important branches of the Sparrow investigation, and it is believed that the evidence collected and published herewith is ample for the final settlement of this much vexed question. More than a thousand original contributions to our knowledge of this subject have been received at the Department, and all the available published testimony has also been consulted, and selections from this have been printed. No pains have been spared in collecting evidence on both sides of the question; and when it became apparent that a large part of the testimony which was coming in was against the Sparrow, a special effort was made to induce friends of the bird to come forward with facts or theories to offset this damaging evidence. As a result, a mass of testimony has been brought together which it is believed far exceeds in amount and value anything ever before collected, and it is now submitted to the public with perfect confidence that no candid reader will ever again deny that the Sparrow molests our native birds, and in many cases drives them away from our gardens and parks. No one should be content to read simply the brief summary presented at this place, but should turn directly to the evidence itself, and satisfy himself that the case is as here represented.

The nature of the evidence is such that it is impossible to summarize it satisfactorily, but the following brief synopsis of matter contributed directly to the Department will show something of its extent.

Total number of original reports submitted	1,048
In the main favorable to the Sparrow	168
In the main unfavorable to the Sparrow	837
Indeterminate	43

This would indicate that about one-fifth of the evidence submitted is favorable to the Sparrow; but if we exclude from the evidence all those reports which consist simply of the answers yes or no to the questions asked on the printed circulars, the percentage of favorable replies will be still further decreased.

Two hundred and eighty-one reports were received which gave little or no evidence on this subject further than these monosyllabic replies, while the seven hundred and sixty-seven remaining reports gave illustrations of the hostile or peaceful relations of the birds, or at least mentioned some species which were or were not molested.

Of these seven hundred and sixty-seven reports only forty-two are entirely, or even mainly, favorable to the Sparrow; seven hundred and twenty-five of them containing evidence unquestionably against the Sparrow, and most of it of the most damaging kind.

This estimate, therefore, which seems to us much nearer the truth than the first, shows that about one-eighteenth of the reports received are favorable to the Sparrow as regards its relation to other birds, but it should not be inferred by any means that therefore even one-eighteenth of the evidence is favorable.

About one witness in eighteen has testified for the Sparrow, but each juror must decide for himself as to the weight to be given to each piece of evidence. For our own part, after careful consideration of each bit of testimony presented, we believe that the proportion of one hundred to one against the Sparrow is the most favorable estimate which any unprejudiced person is likely to make.

LIST OF NATIVE BIRDS MOLESTED BY THE SPARROW.

The following table gives the names of species which the Sparrow is reported to molest, and the number of such reports in each case:

	Reports.
Bluebird (*Sialia sialis*)	377
Western bluebird (*Sialia mexicana*)	1
Robin (*Merula migratoria*)	182
Hermit thrush (*Turdus aonalaschkæ pallasii*)	1
Wood thrush (*Turdus mustelinus*)	4
Thrushes, species not indicated	14
Golden-crowned kinglet (*Regulus satrapa*)	3
Chickadee (*Parus atricapillus*)	1
Titmouse, species not indicated	4
Tomtit, species not indicated	1
White-bellied nut-hatch (*Sitta carolinensis*)	1
Nut-hatch, species not indicated	1
House wren (*Troglodytes ædon*)	64
Parkman's wren (*Troglodytes ædon parkmannii*)	1
Carolina wren (*Thryothorus ludovicianus*	6
Bewick's wren (*Thryothorus ludovicianus bewickii*)	2
Wren, species not indicated	116
Brown thrasher (*Harporhynchus rufus*)	8
Cat-bird (*Galeoscoptes carolinensis*)	33
Mocking-bird (*Mimus polyglottos*)	50
Redstart (*Setophaga ruticilla*	1
Yellow warbler (*Dendroica æstiva*)	11
Myrtle warbler (*Dendroica coronata*)	1
Warblers, species not indicated	15
Red-eyed vireo (*Vireo olivaceus*)	2
Warbling vireo (*Vireo gilvus*)	3
White-eyed vireo (*Vireo noveboracensis*)	1
Vireos, species not indicated	9
Cedar bird, cherry bird (*Ampelis cedrorum*)	4
Purple martin, black martin (*Progne subis*)	65
Martins, species not indicated	198
Cliff swallow, mud swallow (*Petrochelidon lunifrons*)	25
Barn swallow (*Chelidon erythrogaster*)	24
White-bellied swallow, blue-backed swallow (*Tachycineta bicolor*)	40
Violet-green swallow (*Tachycineta thalassina*)	1
Bank swallow (*Clivicola riparia*)	2
Rough-winged swallow (*Stelgidopteryx serripennis*)	1
Swallows, species not indicated	84
Tanager, species not indicated	1
Indigo bird (*Passerina cyanea*)	5
Painted finch, nonpareil (*Passerina ciris*)	2
Grosbeaks, species not indicated	1
Cardinal (*Cardinalis cardinalis*)	1
Redbird, species not indicated	11
Brown towhee, species not indicated	1
Chewink (*Pipilo erythrophthalmus*)	1
Song sparrow (*Melospiza fasciata*)	26
Chipping sparrow, chippy (*Spizella socialis*)	72
Field sparrow (*Spizella pusilla*)	2
Tree sparrow (*Spizella monticola*)	5
Common sparrow, species not indicated	19
Native sparrow, species not indicated	16
Ground sparrow, species not indicated	7
Other sparrows, species not indicated	39
Savanna sparrow (*Ammodramus sandwichensis savanna*)	2
Grass finch, vesper sparrow (*Poocætes gramineus*)	2
Grass bird, species not indicated	1
Snowbirds (*Junco sp?*)	13
Goldfinch Yellow-bird (*Spinus tristis*) Wild canary	32
Arkansas goldfinch (*Spinus psaltria*)	1
Red-poll (*Acanthis linaria*)	1
Purple finch (*Carpodacus purpureus*)	5
House finch (*Carpodacus frontalis*)	3
Other finches, species not indicated	4
Linnet, species not indicated	1
Purple grackle (*Quiscalus quiscula*)	2
Grackles, species not indicated	5
Baltimore oriole (*Icterus Baltimore*)	37
Orchard oriole (*Icterus spurius*)	4
Orioles, species not indicated	10
Meadow-lark (*Sturnella magna*)	3
Red-winged blackbird (*Agelaius phœniceus*)	1
Blackbirds, species not indicated	8
Bobolink (*Dolichonyx oryzivorus*)	5
Shore lark (*Otocoris alpestris*)	1
Blue jay, jay (*Cyanocitta cristata*)	36
Crows, species not indicated	5
Least pewee (*Empidonax minimus*)	3
Wood pewee (*Contopus virens*)	1
Phœbe (*Sayornis phœbe*)	28
Great crested fly-catcher (*Myiarchus crinitus*)	1
Kingbird Bee martin (*Tyrannus tyrannus*) Bee-bird	17
Fly-catchers, species not indicated	8
Insectivorous birds, species not indicated	5
Song birds, species not indicated	31
Humming-bird (*Trochilus colubris*)	1
Chimney swallow or swift (*Chætura pelagica*)	3
Red-headed woodpecker (*Melanerpes erythrocephalus*)	3
Yellow-bellied woodpecker (*Sphyrapicus varius*)	1
Sap-sucker, species not indicated	2
Downy woodpecker (*Dryobates pubescens*)	8
Hairy woodpecker *Dryobates villosus*)	1
Golden-winged woodpecker, flicker (*Colaptes auratus*)	3
Woodpeckers, species not indicated	6
Yellow-billed cuckoo (*Coccyzus americanus*)	1

In addition to the birds specifically mentioned in the foregoing list, many other reports have been received alleging attacks on birds, but not mentioning the species so molested. Thus sixty-five reports mention molestation of "native birds;" forty-eight reports speak of "other birds" being driven off; seventy-eight reports state that the Sparrow molests or drives off "nearly all species;" twenty-eight claim a similar effect on "all small birds;" five claim the same for "yard birds," and two for "domestic birds."

Ten observers report attacks upon domesticated doves or pigeons, and one each on hens and chickens.

It will thus be seen that the reports mention specifically seventy kinds of wild birds which are known to be molested more or less by the Sparrow. A majority of these birds are species which nest about houses and gardens, and, with the exception of the crow, jay, and possibly one or two others, all are decidedly beneficial to the farmer and gardener.

Naturally the birds most affected are those whose nesting habits are similar to those of the Sparrow; that is which nest mainly in boxes provided for them; in cavities or cornices of buildings; under the eaves of barns or outhouses, or in the natural cavities of trees.

Thus, in a total of about 1,860 complaints, we find that more than half relate to martins, swallows, wrens, and bluebirds, whose nests or nesting places are coveted by the Sparrow.

But in most places the Sparrows long since outgrew such accommodations and were compelled to build nests among the branches of trees, like other birds; and at once such bulky nests as those of the robin, catbird, etc., were seized upon and utilized either as building material or as foundations for new nests. Thus new quarrels have been continually originating, and the Sparrow has been steadily encroaching on the territory of other birds. Although a large part of the trouble with native birds has doubtless arisen from questions over nesting places, still there is abundance of testimony that the Sparrow molests birds under other circumstances.

Nearly one-third of all the complaints of injury to other birds relate to species whose nesting and food habits are very different from those of the Sparrow, and whose relations with this bird might reasonably be expected to be peaceful and pleasant. Among such may be mentioned the mockingbird, chipping sparrow, song sparrow, goldfinch, Baltimore oriole, yellow warbler, and vireos. Of course many of these birds, as well as those previously mentioned, offer more or less resistance to the advances of the Sparrow, but in most cases the resistance is useless and the native birds are compelled to retire from the field sooner or later. It may be well, however, to postpone such general considerations and conclusions until we have taken up the charges against the Sparrow one at a time and submitted evidence on both sides of the question. In doing this, it will be convenient to divide the subject into three parts:

I. The relation of the Sparrow to birds which nest principally in cavities, natural or artificial, and often in boxes prepared by man.

II. The relation of the Sparrow to birds which usually nest in trees, or at least not in places especially prepared for them by man, but whose nests or nesting sites are often appropriated by the Sparrow.

III. The relation of the Sparrow to other species than those included under the two preceding heads, or to those species under such conditions that the question of nesting has no direct influence.

RELATION OF THE SPARROW TO BIRDS WHICH NEST PRINCIPALLY IN CAVITIES, NATURAL OR ARTIFICIAL, AND OFTEN IN BOXES PREPARED BY MAN.

The birds coming most naturally under this head are the bluebird, the purple martin, the white-bellied swallow, and the house wren, species which appear to suffer more severely from the encroachments of the Sparrow than all others combined.

Strange as it may seem, it is very evident that some observers are in doubt as to what consitutes an attack on a bird, and many more are uncertain as to the meaning of the word molest.

Thus one man writes:

> If the Sparrow molests native birds, it has escaped my observation. Wrens and bluebirds attempt to reclaim former nesting sites; the former always succeeding, so far as I have observed; the latter seldom.

There can scarcely be any question that a Sparrow molests another bird when he takes possession of that bird's nest or former nesting place and holds it against all efforts of the rightful owner; and this is precisely what the Sparrow does in thousands of places every spring.

John Bessmer, of Hastings, Barry County, Mich., writes:

> * * * I have had good opportunities for observation, and I believe the facts are these: Staying over winter, as he does, the Sparrow selects good nesting places, and then, when the Wren, Bluebird, or Martin comes in the spring, sometimes he finds his old nesting place occupied and the fight commences. If it is a Bluebird, he will drive half a dozen Sparrows away, unless they should have eggs or young, in which case they can not be driven. * * * Last spring they tried to drive a pair of Sparrows out of a bird-house where the Bluebirds had a nest the year before, but the Sparrows were breeding then and stood their ground well. Then the Bluebirds built their nest in the other half of the same house, and afterwards lived in harmony, the Sparrows in the north half and the Bluebirds in the south, with only a partition between. (October 7, 1886. Present about ten years.)

SPARROW *versus* BLUEBIRD AND PURPLE MARTIN.

The Bluebird undoubtedly is one of the pluckiest of our native birds, and when it has eggs or young the Sparrow has hard work to dislodge it, yet even then it sometimes succeeds. On the other hand, when the Sparrow appropriates a box before the return of the Bluebird, in most cases it holds it against all new-comers. In reply to the schedule question as to the species which resist the encroachments of the Sparrow, thirty-three observers report the Bluebird as uniformly successful, and thirty report it as successful sometimes, a total of only sixty-three reports, against three hundred and seventy-seven complaints of molestation.

The following are examples of the testimony relating to the Bluebird:

From B. T. Gault, Chicago, Ill.:

I have repeatedly seen the English Sparrow drive Martins from their boxes and Bluebirds from their nests, in both cases destroying the eggs and pulling the nests to pieces. (October 29, 1885.)

From H. H. Miller, Sandy Spring, Montgomery County, Md.:

I know of an instance where two pairs of Bluebirds fought for two weeks to keep their boxes, but were beaten in the end: also of a case where the hole in a Wren's box was too small for the Sparrows to get in, and they pulled out the nest and broke the eggs. (February 16, 1887. Present about eight years.)

From John L. Huber, Tell City, Perry County, Ind.:

The Bluebird and Martin resisted the first and second year, but the Sparrow proved victorious, and after the second year they did not come back. (October 8, 1886. Present about twelve years.)

From Walter B. Hull, Milwaukee, Wis.:

I put up about a dozen boxes this year, and native birds started to build in nearly all. One Bluebird succeeded in raising a brood, and that because so close to the house that I could interfere when a fight began. All the other houses were stuffed with straw, and young Sparrows were hatched in them, the rightful owners having fled. (August 23, 1886. Present about six years.)

From Clarence L. Cate, Spencer, Worcester County, Mass.:

There is a bird-house on my hen-coop in which a pair of Bluebirds have nested for three years without being molested; but the Sparrow has at last driven them off, and now occupies the house. I know of one case where it has driven away the Orchard Oriole. (October, 1886. Present about eleven years.)

From L. Bunnewitz, Wolcott, Scott County, Iowa:

Bluebirds and Martins attempt to reclaim former nesting-sites. I had to kill a Sparrow in order to give a Bluebird back his little house; Martins can defend themselves. (October 8, 1886. Present about four years.)

From Jerome Trombley, Petersburgh, Monroe County, Mich.:

A pair of Sparrows last spring appropriated one of my bird-boxes, occupied, the previous year by Bluebirds. When the latter arrived they immediately declared war, and in three or four days had vanquished the foreigners. (August 23, 1886. Present about nine years.)

From Daniel S. Wadsworth, Hartford, Conn.:

It does not drive away our native birds; I have seen it battle with Bluebirds, but not successfully. A Sparrow had occupied a hole in an apple tree when the Bluebird came, but after several battles the latter took possession of the hole and reared its young there. (October 11, 1886. Present about eight years.)

Other evidence will be found interspersed in the testimony relating to martins, swallows, and wrens, where the conditions are often identical and the results practically the same.

Probably the Purple Martin resists the Sparrow more successfully than any other box-inhabiting species, mainly owing to its size and to the fact that it nests in communities, and hence is able to make a more equal fight; yet when we compare the soft, weak bill, short legs, and small feet of the Martin, with these parts in the Sparrow, it is difficult to understand how it can ever succeed in a combat where the numbers on the opposing sides are nearly equal.

Owing to the fact that the White bellied Swallow (*Tachycineta bicolor*) is called " Martin" in some places, it is impossible to give accurate figures on the Purple Martin, though there is little doubt that in most cases this latter species is referred to where the term "Martin" is used, and always when " Black Martin" is given.

Complaints of molesting the Purple Martin were received from sixty-five observers, and complaints regarding the " Martin" from one hundred and ninety-eight. Twenty observers state that the Purple Martin resists the Sparrow with more or less success, while sixty-two give similar testimony for " Martins ;" a total of eighty-two witnesses of complete or partial victories for the Martin, against two hundred and sixty-three witnesses of quarrels. The proportion of successful resistances for this species would seem therefore to be nearly double that shown for the Bluebird, or even more than double if we admit, as we must, that some of the complaints of molestation undoubtedly refer to the White-bellied Swallow. For the reasons already mentioned it is obvious that the summary of the reports on the White-bellied Swallow can not be considered exact, but from the returns which unquestionably relate to this species, it would seem to be fully as successful as the Purple Martin in resisting the Sparrow. The summary shows forty complaints of molestation and seven cases of more or less successful resistance, a showing scarcely to be expected in view of the fact that this species is much smaller than the Martin, and very similar in structure and habits. The following examples of evidence show how severe the struggle for nesting places often is between the Sparrow and Martins.

From C. Augustus Rittenhouse, Collegeville, Montgomery County, Pa.:

> All birds that build in boxes and holes in old trees are driven off. I have several boxes in which Bluebirds and Martins reared their young every season until the Sparrows fought them out and took possession. I have seen them throw the young out of the nest and fly to the ground and kill them. I could fill this paper with examples of this kind. Boxes are being removed wherever they build. (August 18, 1886.)

From A. Ford, Bronson, Bourbon County, Kans.:

> It pulls the Martin and Swallow from their nests and throws out the eggs. (October 11, 1886. Present about two years.)

From H. Volkening, Lenzburgh, Saint Clair County, Ill.:

> Martins and Swallows resist, but not successfully. I have built houses for the Martins and Wrens as have some of my neighbors, but the Sparrows fought them away and destroyed the nests with the broods in them. (October 4, 1886. Present about three years.)

From W. V. Hardy, Holman Station, Scott County, Ind.:

> In the spring of 1886 four pairs of Martins came to my boxes. The Sparrows drove away two pairs, but by shooting the Sparrows as fast as they came the others were induced to stay. (September 6, 1886. Present about four years.)

From S. D. Crites, Elida, Allen County, Ohio:

I have watched the battles between Sparrows and Martins, by the hour. Now there is not a Martin to be seen in the country. (September 4, 1886. Present about ten years.)

Frequently the Sparrow is unsuccessful in its first attempts to dislodge Martins, but ultimately it succeeds. Many observers testify to the fact that the two species live peaceably in different compartments of the same box, and some of these observers have witnessed the struggle which doubtless always precedes such a truce. Probably in every such case the contest is renewed each spring soon after the return of the migrants; and the entering wedge having been once secured, the Sparrows keep pushing until sooner or later the migrants find it easier to go elsewhere than to continue the fruitless struggle.

Dr. F. H. Kimball, of Rockford, Winnebago County, Ill., writes:

Purple Martins formerly nested in the hollow work of an iron bridge. The Sparrows in vain attempted to dislodge them, and now live in neutrality with them. (September 28, 1886. Present about eight years.)

Dr. Daniel Berry writes from Carmi, White County, Ill.:

In 1872, I built a business house on the site of a church. Over the door of the church one or two pairs of Black Martins had a home. In the new building they found superior facilities for lodgment, of which they availed themselves, and increased wonderfully. This summer the colony must have been more than a thousand. On their arrival in the spring they find their quarters in possession of the Sparrows, when the fight for ejectment begins. The Martins have been strong enough to regain possession so far, but this is not always the case. When the Sparrows in force attack a pair of Martins or Bluebirds nesting in boxes they invariably drive them away. (October 6, 1886. Present about ten years.)

Herman Koerner, of Birdseye, Dubois County, Ind., writes:

I have a bird-house with twelve apartments which was occupied in 1885 by six pairs of Martins, but was taken possession of in the winter of 1885–'86 by the Sparrow. When the Martins returned there was a week's war, then a compromise, and each took six rooms. (October 7, 1886. Present about three years.)

Dr. Geo. H. Jennings, of Jewett City, New London County, Conn., writes:

Martins and Bluebirds attempt to reclaim former nesting sites when occupied by the Sparrow, but as often fail as succeed. It is common to see a bird-box occupied in part by Martins and in part by Sparrows. Often they thus settle down after more than a week of quarreling. White-bellied Swallows, Wrens, Martins, and Bluebirds often resist; the three latter sometimes effectually. (September 11, 1886. Present more than eleven years.)

Robert W. Curtiss, Stratford, Fairfield County, Conn., writes:

The Sparrows build nests every spring in my martin-box, but when the Martins come in full force they drive them out. (October 11, 1886. Present about fourteen years.)

M. S. Lord, of Saranac, Mich., writes:

I have had a martin-house for the last eight years, and the Martins always take possession when they come, although the Sparrows occupy it before and after. (October 8, 1886. Present seven years.)

NEGATIVE EVIDENCE.

A very few observers are still skeptical about the alleged attacks on other birds, and occasionally a correspondent appears to be convinced that the Sparrow is innocent of all such crimes charged to it.

Dr. H. A. Hagen, of Cambridge, Mass., writes:

I have never seen it molest other birds; indeed in the next street, in a house with one entrance, Swallows and Sparrows brooded together, and both had young. I have seen the Sparrow driven out of its house by Bluebirds. (April 13, 1884. Present about eleven years.)

Ferdinand Schumacher, of Akron, Ohio, writes:

I have not observed it to molest other birds. A bird-house in my yard, occupied for several summers by Martins, was invaded and occupied early in the spring by the Sparrows; but with one or two individual exceptions they were driven out by the Martins. The remaining one or two families occupied the house jointly and peaceably with the Martins. (October 25, 1886. Present about eleven years.)

The late Prof. Chas. Linden, of Buffalo, N. Y., wrote in 1885:

I do not believe that there ever will be an authenticated, true report of a battle between Sparrows and our native birds, excepting, perhaps, with the White-bellied and Barn Swallows. I have observed them pilfering the angleworm gains of the Robin, which otherwise, like the aggressive Bluebird, is well able to take care of itself.

Another observer is equally positive, and says:

I do not believe the Sparrow drives away any of our native birds. I speak from careful observation, and they are just as plentiful here now as before the advent of the Sparrow. I have never seen the Sparrows band themselves together for attack, and am satisfied they do not do it. It is pair against pair. The assertion that they attack other birds in a body is sheer nonsense; no such thing is known in natural history of any species of bird.

As bearing on this last point, that the Sparrow does not attack other birds in numbers, the following testimony may be of interest:

From Jesse G. Case, Peconic, Suffolk County, N. Y.:

It has driven off our Martins. They have a fight every spring, and the Sparrows succeed by force of numbers. Sometimes a dozen Sparrows will surround one Martin. (1885.)

From the postmaster at Jamestown, Russell County, Ky.:

The Bluebird and Black Martin attempt to reclaim former nesting sites, but are attacked by the Sparrows in squads, and routed. (October 27, 1886. Present four years.)

From H. Harris, Union Springs, Bullock County, Ala.:

The Sparrows will not singly attack any bird, but usually unite in an army to do their work. I have known them to kill out at least a dozen pairs of Martins, young and old, at a single attack. (September 17 and 24, 1886. Present about six years.)

From John J. McDannold, Mount Sterling, Brown County, Ill.:

The Martin and Bluebird always try to reclaim former nesting sites, but never succeed, because of re-enforcements, the Sparrows flocking in great numbers to the assistance of a distressed brother or sister. Though the Martins and Sparrows are bitter enemies, it is nearly always some nesting difficulty that causes trouble between them. (September 4, 1886. Present about three years.)

From Prof. F. H. King, River Falls, Wis.:

> Mr. H. T. Baker, of Berlin, Wis., has related to me that last summer he was a witness of a conflict between some English Sparrows and Purple Martins, in which the Sparrows were trying to get possession of breeding places which had been occupied for several years by the Martins. The Sparrows congregated in a large flock upon a tree standing near the building in the cornice under the eaves of which the Martins had their nests. From this point a number of Sparrows would together attack the Martins and then return to the tree, to be followed by a similar squad. This method of attack was followed until three Martins had been killed, some of them having had their eyes picked out. It need hardly be added that the Martins were forced to leave. The same gentleman tells me that he saw the Sparrows kill, in the same manner, a bird, the name of which he did not know, in the city of Milwaukee. (January 31, 1887.)

SPARROW *versus* WRENS.

The House Wren is one of the birds often attacked by Sparrows, and it is claimed that in very many cases it has been driven away by them.

Most reports which mention "wrens" doubtless refer to this species, so we shall probably not be far from correct if we state that the reports of molestation of this species number one hundred and eighty, while thirty-nine observers report it as more or less successful in resisting the inroads of the Sparrow. It would thus appear to be somewhat more successful than the bluebird, but less so than the martin.

In many cases protection has been afforded this pugnacious but interesting little songster by supplying it with a box the entrance to which is too small to admit the Sparrow; but this does not suffice in all cases. The evidence relating to this species is particularly full and interesting, but we have room here for only a few examples.

Wallace D. Rhines, of Constantia, Oswego County, N. Y., writes:

> I have seen Wrens driven out of their houses and not allowed to enter until I had driven the Sparrows away; but not being able to help them all the time, they have left their house in possession of the Sparrows. (August 23, 1886. Present four or five years.)

Edward Burrough, of Merchantville, Camden County, N. J., writes:

> The Wren makes the most determined resistance, but is generally defeated. (September 2, 1886. Present about ten years.)

J. F. Niesz, of Canton, Stark County, Ohio, writes:

> The Bluebirds were driven away the first year the Sparrows came, and have not returned since. The Sparrows fought the Wrens all last summer in a sugar-tree near my house, but the Wrens hatched a brood there. Then they went into the carriage-house and hatched a second brood there. In the spring they came back to their sugar-tree branch, but the Sparrows tried to drive them away, reaching into the hole and trying to pull them out. We began shooting the Sparrows (only while fighting), and shot twelve, but the Wrens were so harassed that they failed to hatch their brood, and left my farm. I have only observed the Sparrows molesting Bluebirds, Wrens, and Chippies, but I notice a scarcity of other species formerly abundant. (September 6, 1886. Present about three years.)

P. L. Ong writes from Hennepin, Putnam County, Ill.:

> It has not as yet driven away any of the native birds from this locality, but it was seen to throw the young, and to commence to throw the nest of a House Wren out of

a stump here this summer. After being driven away, however, it did not molest the nest again. The young Wrens were replaced. It tried to whip some Bluebirds, but we drove it away and it did not again molest them. (November, 1885.)

A. H. Mundt, of Fairbury, Livingston County, Ill., writes:

It sometimes drives Wrens and Bluebirds from their nesting places. I have noticed them repeatedly trying to drive the Wrens from their boxes, but the holes were too small to admit them. (October 6, 1886. Present five or six years.

Robert W. Barrell writes from South Bethlehem, Northampton County, Pa.:

House Wrens especially are driven out of their homes, even when the openings are so small that the Sparrow can not enter. Under such circumstances I have known Sparrows to stand in front of the entrance and keep the Wrens off, and I have shot the Sparrows while doing it. (September 16, 1886.)

M. Abbott Frazar, of Mount Auburn, Middlesex County, Mass., writes:

Before the Sparrow made its appearance on our place I had about 10 pairs of White-bellied Swallows, 5 pairs of Bluebirds, and 15 pairs of Wrens, breeding in boxes put up for them. Now the birds are all gone. The Sparrow breeds so early that all the boxes are occupied, and very likely have young in them when the other birds arrive from the South; so the migrants are driven out. (Autumn, 1885.)

J. B. Stockton writes from Toronto, Kans.:

It has not been observed to drive away any of our native birds. In a contest last spring the little House Wren actually drove the Sparrow out, and getting inside the nest box kept the Sparrow out and finished its laying and incubation. The Bluebirds also attacked the Sparrows, and after a contest lasting six hours drove them from a box I had put up for them. (October 6, 1886. Present about one year.)

William Holmead, of Mount Pleasant (in the suburbs of Washington, D. C.) writes:

The Wren, Bluebird, Common Sparrow, and Martin were formerly very numerous here, and nested in trees and houses, but all without exception vacated them years ago. One case in particular which I remember is that of a Wren which built her nest in a box I had prepared for her. The Sparrow destroyed her young and tore up her nest, and after several attempts to rebuild it she disappeared. (November 8, 1886. Present about fifteen years.

RELATION OF THE SPARROW TO BIRDS WHICH USUALLY NEST IN TREES, OR AT LEAST IN PLACES NOT ESPECIALLY PREPARED FOR THEM BY MAN.

Under this head may be included very many of our common garden and farm birds, such as the Robin, Mockingbird, Goldfinch, Phœbe and other flycatchers, Vireos, and certain sparrows and swallows, especially the Cliff Swallow (*Petrochelidon lunifrons*).

SPARROW *versus* CLIFF SWALLOW AND BARN SWALLOW.

The Cliff-Swallow is also known as the Mud Swallow, Eave Swallow, Jug Swallow, and occasionally as the Barn Swallow, though the latter name more properly belongs to the fork-tailed swallow, which most often nests inside of barns, placing its nest against the rafters and using a mixture of mud and straw in its composition. The Cliff Swallow, on the contrary, usually nests in large colonies on the outside of buildings, placing the gourd-shaped nests in rows beneath the eaves, and using no straw except perhaps for the lining of the nest, the outer shell being made entirely of pellets of mud, plastered together and to the building. This nest when finished commonly has a projecting neck like that of a flask, for entrance, whence the name jug-swallow. The whole structure is brittle, and rarely if ever serves the swallow for more than one season, but the newly-built nests serve the Sparrow's purpose admirably, and he avails himself of them at every opportunity.

Henry Hales, of Ridgewood, Bergen County, N. J., writes:

I have seen a large colony of Eave Swallows abandon their nests, that had been established in large quantities all along a barn, rather than fight the Sparrows. (June 18, 1887. Present about fifteen years.)

J. C. Swetland, of Sparta, Morrow County, Ohio, writes:

The small barn-swallow that builds on the eaves of the barn [Cliff Swallow, *Petrochelidon lunifrons*], attempts to reclaim former nesting sites. There are over four hundred swallow's nests on my barn, and last spring the Sparrows began to take possession of the nests, and for two weeks there was a constant fight between the Sparrows and swallows. Finally, the Sparrows took possession of one side of the barn and the swallows took the other. (October 18, 1886. Present about three years.)

Dr. H. D. Moore, of New Lexington, Somerset County, Pa., writes:

Within the last year or two the Sparrows have found their way out of the cities and have taken up their abode around farm buildings all over the country. Most of the barns are what are known as "bank" barns, and underneath the extensions of these, Mud Swallows (*Petrochelidon lunifrons*) have been building and hatching by hundreds at each barn. I saw, this summer, where one pair of Sparrows had taken possession of one nest and driven the entire colony of swallows to the other end of the barn. At other barns I saw where several pairs of Sparrows had taken possession of as many nests and driven the swallows all away. Farmers generally know the value of swallows as insectivorous birds, and have been protecting them against cats, rats, mice, etc., but this last enemy is the worst of all, and long and loud are the curses poured upon the "cuss" who imported the first Sparrows. (September 13, 1886.)

B. C. Townsend, of Bay Ridge, Kings County, N. Y., writes:

As regards the peaceful relations of the English Sparrow to other birds, my experience confirms the testimony of my neighbor, Mr. J. A. Perry, with the exception of a single case. There were certain swallows building their mud nests under our front porch, which nests it attacked with great violence and destroyed, driving the birds away. (March 27, 1886.)

William J. Muldragh, of Sand Hill, Wayne County, Mich., writes:

Large numbers of swallows formerly nested on our barn, but they have nearly all left since the Sparrows began building in their nests this year. (August 23, 1886.)

The true Barn Swallow (*Chelidon erythrogaster*) is also seriously persecuted by the Sparrow, forty-nine complaints relating to these two species having been received, as against seven reports of more or less successful resistance, but none of these favorable reports give any details of the contests.

A. L. Parkhurst, of San José, Santa Clara County, Cal., writes:

Cliff Swallows and Western House Finches retain their usual nesting places in spite of the presence of these noisy neighbors. (August 27, 1886. Present about five years.)

About eighty observers report molestation of swallows without giving the specific name, while only six cases of successful resistance are mentioned.

H. Morrison, of Ithaca, Gratiot County, Mich., writes:

Robins, swallows, and native sparrows make some resistance, but with no success; they are all gone now. I have seen a swallow fight over a nest until it was nearly killed, so that it died soon after. (October 6, 1886. Present four years.)

W. G. Markham, of Rochester, N. Y., writes:

I have seen half-grown swallows attacked by Sparrows and drawn from their nests and destroyed. (September 19, 1887.)

The last two notes may refer to the White-bellied Swallow, already mentioned, a species commonly nesting in holes in trees, but sometimes also in boxes or in nooks about buildings.

SPARROW versus ROBIN.

The influence which the Sparrow exerts on the Robin during the nesting season may be inferred from the following:

From E. Bradford, Sparta, Kent County, Mich.:

The Robin comes every spring and tries to build nests, but is driven away. (October, 1886. Present about six years.)

From Edward T. Keim, Dubuque, Iowa:

For many years a pair of Robins nested in an apple tree here, and shortly after the introduction of the Sparrow they were attacked, but with man's assistance the Sparrows were kept off for two seasons. Force of numbers, however, finally prevailed, and the Robins have not been seen now for years. (August 19, 1886. Present about ten years.)

From F. J. C. Swift, Falmouth, Barnstable County, Mass.:

Last spring I observed a female Sparrow, unassisted by the male, frequently, for two days engage in battle with a male and female Robin for possession of the Robin's completed nest, and at the expiration of that time she drove them from the premises and occupied their nest. (Autumn, 1885.)

From Dr. A. B. McCrea, Berwick, Columbia County, Pa.:

During the past season I knew an instance where the Sparrows attacked a pair of Robins, broke their eggs, and literally destroyed their nest. (September 1, 1885.)

From H. A. Koch, College Hill, Hamilton County, Ohio:

I noticed one case in the spring of 1884, where a pair of Robins had a nest containing eggs in a poplar tree near a house. A pair of Sparrows drove the female away, tipped out the eggs, and built a nest of their own on top of the Robin's, and it soon after contained five eggs. (August 25, 1885.)

From Dr. R. L. Walker, Mansfield, Allegheny County, Pa.:

A friend tells me he found a dead young Robin on the sidewalk, and on looking up into the tree which stood alongside, he saw the Sparrows busy trying to throw out the other young Robins and tear up the nest in the absence of the old birds. (July, 1887. Present about five years.)

Many similar instances have been reported and will be found in full in their proper place. In all one hundred and eighty-two complaints of molestation of the Robin have been received, against twenty-eight reports of more or less successful resistance.

We append one or two illustrations of the latter class:

From F. B. Rich, South Richland, Oswego County, N. Y.:

I have seen the Sparrow drive off Bluebirds, but I have also known a Robin to build its nest and raise young within 4 feet of a bird-house inhabited by a lot of English Sparrows. (1885.)

From J. W. Pearson, Newton, Middlesex County, Mass.:

Last year two Sparrows commenced to build a nest under our porch in front of the house, and while they were at work upon it two Robins came and drove them away, and took possession of the porch and built a nest for themselves, while the Sparrows went to a pear tree just in front of the house and built a nest and reared five young ones. Does this look like Sparrows driving away other birds? (April, 1884. Present seven years.)

SPARROW *versus* MOCKINGBIRD.

In the Southern States the Mockingbird is frequently interfered with by the Sparrow, and in spite of its courageous resistance it is often obliged to yield to superior numbers. Fifty reports of such trouble have been received, against twelve reports of more or less successful resistance. Thus in about one case in four this magnificent songster now holds its ground against the Sparrow, but as the enemy becomes more numerous less favorable results may be looked for.

The following are a few samples of evidence submitted:

From Charles L. Dendy, Hamilton, Harris County, Ga.:

The Mockingbird, like the Sparrow, prefers for its habitation the evergreen shrubbery around dwellings and yards. The former is the larger bird, and could more than hold his own single-handed, but he finally succumbs to persistence and numbers. (September 8, 1886. Present five or six years.)

From the postmaster at Marion, Crittenden County, Ark.:

The Sparrow drives off the Wren, Mockingbird, and all smaller birds. * * * I am satisfied that our favorite songster, the Mockingbird, will have to go. (September 18, 1886. Present about four years.)

From J. B. Stacy, Pulaski, Giles County, Tenn.:

It drives off all song-birds, and especially the Mockingbird. (September 1, 1886. Present about three years.)

From Charles E. Nesmith, Donaldsonville, Ascension County, La.:

The Sparrows drive off native birds. I have seen them take from the nest and cast on the ground the young of woodpeckers, Mockingbirds, yellow-birds, and other small birds. (1886.)

From Abel A. Wright, Griffin, Spalding County, Ga.:

Mockingbirds will not give way to it, but retain their old haunts, where they build and hatch every season. I have not observed it to molest or drive off other birds. (October 5, 1886.)

From the postmaster at Athens, Limestone County, Ala.:

I have seen Mockingbirds whip the Sparrow and drive it from my premises. I do not think the Sparrow drives off any of our native birds. (September 18, 1886. Present about six years.)

Many people have expressed doubt as to the possibility of the Sparrows driving away birds of the size of the Robin, or species as pugnacious as the Mockingbird and Catbird, but in most cases these doubters lose sight of the fact that many birds are more readily driven away by small annoyances often repeated than by a single strong attack, and although almost all birds defend their young valiantly, they are very apt to desert nests which are in process of construction if disturbed while at work, or before any eggs are laid. Even the Purple Grackle or Crow Blackbird is not exempt from the Sparrow's attacks, and the following testimony shows that it does not always resist these attacks successfully:

Dr. J. F. Detweiler, of Wadsworth, Medina County, Ohio, writes:

> The boat-tailed blackbird [Purple Grackle] has roosted and nested for many years in some large pines in a neighbor's yard across the street, but last year the Sparrows drove them away, and occupied the trees with their nests, a hundred or more in number. (December 10, 1887. Present about thirteen years.)

SPARROW versus VIREOS.

Many of the smaller birds which use various soft materials in the construction of their nests are continually robbed by the Sparrow.

Dr. B. H. Warren, of West Chester Pa., has given a graphic account (published elsewhere) of the destruction by Sparrows of the nest and young of a Warbling Vireo; and the following notes relating to other vireos were received recently from George H. Berry, of North Livermore, Me.:

> At Holyoke, Mass., on June 5, 1884, I found a set of eggs of the White-Eyed vireo, and also another set begun with two eggs. On June 7 this last nest was forsaken, and in a box in the tree two pairs of English Sparrows were building their nests. On June 8 I saw a fight between a pair of birds, but could not tell what they were, so fired and shot them. One was a female English Sparrow, the other a male White-eyed Vireo. On June 12 I found an English Sparrow appropriating the nest of a vireo, and carrying away to her own nest the material of which it was composed. On the 14th of June I found two empty vireos' nests, partially destroyed, probably by either the English Sparrow or Kingbird.

RELATION OF THE SPARROW TO OTHER BIRDS UNDER SUCH CONDITIONS THAT THE QUESTION OF NESTING HAS NO DIRECT INFLUENCE.

Nearly all the species already mentioned have occasional encounters with the Sparrow, even at times when all have good nesting places; but it is probable that the ill feeling which prompts these quarrels was originally engendered by conflicts over nests or nesting places. There are many species, however, which appear to be very unfavorably affected by the presence of the Sparrow, yet which do not seem to come in conflict at all as regards nesting places. In some cases the trouble may be caused by competition for food, but in very many cases it is difficult to account for the quarrel except on the ground that one of the combatants is naturally pugnacious and has made an unprovoked attack on the other.

ENGLISH SPARROW *versus* CHIPPING SPARROW.

One of the birds which suffers most is the Chipping Sparrow (*Spizella socialis*), which in some localities seems to have been driven completely away by its foreign relative.

Naturally confiding in its disposition, it was accustomed before the advent of the English Sparrow to pick up the crumbs about our door-yards and to build its little hair-lined nest in the rose and lilac bushes under our windows. But already this is a thing of the past in most towns and cities, and there is no escape from the conclusion that the English Sparrow is mainly responsible for the change.

More than seventy observers testify to the attacks on the "Chippy," and but two reports have been received which mention even partial success in resisting.

Dr. A. P. Sharp, of Baltimore, Md., writes:

> I have been a close observer of the English Sparrows since they first made their appearance on my place, in Kent County, Md. I am a great admirer of the little wrens, martins, and House Sparrows, as we call them (*S. socialis*), and felt an interest in them. Having martin boxes near the house, as well as boxes for the Wrens and Bluebirds, I had a good chance to watch the new-comers, and can say without hesitation that I think they are the greatest nuisance ever introduced in our country. Notwithstanding I have been for years shooting them whenever I can get a chance, they have nearly exterminated the Wrens and Sparrows, and lessened the number of Martins and Bluebirds. The young Wrens, Sparrows, and Bluebirds are destroyed as soon as they are hatched. While the parents are looking for food, the English Sparrows will go to the boxes and pull out the young, featherless birds and kill them. With the House [Chipping] Sparrow I have known them not only to kill the young the first day they were hatched, but to tear up the nests in a few minutes. For years I have encouraged the little Chippy to build her nest in my honeysuckle, but last year I had not a single nest near the house. I had two in 1885, and tried every way to protect them, but the young were destroyed as soon as hatched, and the nests were torn to pieces. (February 16, 1887.)

F. R. Welsh, of Philadelphia, Pa., writes:

> On the 17th instant, I noticed five English Sparrows pecking at a young Chipping Sparrow. The latter was able to fly (as I subsequently ascertained) about twenty yards at a time. The Chipping Sparrow would offer a feeble resistance and then fly two or three feet. The English Sparrows would follow and take turns in pecking at it. They had pulled out about one-third of the feathers on its head, which was bleeding slightly. There was also a small bare place on its back. The Chippie invariably faced its enemies until he had received several pecks and then flew off to one side. Many other English Sparrows were in the trees near by, but took no notice of the affair. As soon as I went up to the young bird the parents came fluttering round, probably attracted by its cry. While the English Sparrows were about I did not hear a sound from it. Another young Chippie, about fifteen yards off, had nearly all of its head feathers and a few of its body feathers pulled out. (August 9, 1887.)

It is scarcely surprising that after such treatment as this the Chipping Sparrow is not as abundant as formerly about our houses and gardens

THE SPARROW "MOBBING" OTHER BIRDS.

The Robin is often attacked and robbed of his food by the enterprising Sparrow, as is shown by the testimony of many witnesses.

Charles B. Fuller, of Portland, Me., writes:

I have repeatedly seen the Sparrow follow the Robins and rob them of such food as they unearthed; can not say what the food was. (May 31, 1884. Present ten years or more.)

Dr. F. H. Kimball, of Rockford, Ill., writes:

I have seen the Robin more frequently molested by the Sparrow than any other bird, chiefly in the way of being driven from its food or having its food stolen. (September 28, 1886. Present about eight years.)

A. C. White, of Jefferson, Ashtabula County, Ohio, writes:

I have observed that it follows Robins and Bluebirds and takes from them worms and insects which they find. (September 3, 1886. Present about seven years.)

Sometimes the attack is entirely unprovoked and without any apparent object, as in the following case sent by W. J. N. Osterhaut, of Providence, R. I.:

March 30, 1884, heard a Robin for the first time caroling his morning song in a pine tree near the house. I went out to watch him, and had not been standing long watching him when at least a dozen Sparrows flew up into the tree and pitched into him. Poor Robin was driven from tree to tree and badly whipped. There were no nests of the Sparrows near and they evidently fought the Robin, who was peaceably enjoying himself, from pure hatred of any intruder. Such instances are innumerable and are constantly occurring. The Robin referred to in this instance disappeared and I have not seen him since. (April, 1886.)

Native birds are frequently driven away or "crowded out" without any actual attack, the Sparrows simply following them about and threatening them until they become uneasy and leave.

The reader should turn to the testimony of Mrs. Olive Thorne Miller, of Brooklyn, N. Y., and read her account of this method, which has been termed "mobbing." Similar testimony will be found under the head of Washington, D. C., and in other places among the evidence. Even the Kingbird is thus "mobbed" and sometimes is actually attacked.

George B. Holmes, of Fernwood, Cook County, Ill., writes:

I have known Sparrows to challenge a Kingbird, but they were always whipped. (August 27, 1886. Present about five years.)

William F. Doertenbach, of Cleveland, Ohio, writes:

In July, 1883, a Kingbird was attacked by two English Sparrows, but he resisted and finally drove them off. In about one minute, however, he was attacked by a dozen or more Sparrows from different points. He flew straight up into the air for about one hundred feet and then swiftly to the southward. This happened in front of my house. (November 8, 1886. Present about thirteen years.)

The list of species actually attacked, without regard to nesting controversies, is a very considerable one, but we shall only mention a few.

Owen Durfee, of Brooklyn, N. Y., writes:

I saw a pair of Golden-crested Kinglets, November 19, 1883, and when first seen about two dozen English Sparrows were attacking them.

P. B. Loomis, of Jackson, Mich., writes:

My carpenter, a man of veracity and close observation, says he has seen it kill our smaller song sparrows. (July 20, 1884. Present about eight years.)

Dr. Edgar A. Mearns, of Highland Falls, Orange County, N. Y. writes:

It frequently attacks and drives away the native birds. It has been seen to kill a Yellow-bellied Woodpecker in a back yard at 32 Park avenue, New York City, and also a Robin in Washington Square, New York City. (February 27, 1884.)

J. Percy Moore, of Philadelphia, Pa., writes:

* * * The Sparrow is certainly very pugnacious, and I have often seen it attack and chase even such a large bird as the domestic pigeon (October 13, 1885); and in July, 1883, two were seen to attack and put to flight a Crow. I have also seen them attack the Ruby-throated Hummingbird (September 10, 1884) and Chipping Sparrow (October 7, 1885). (October 15, 1885. Present nineteen years or more.)

Henry Stewart, of Hackensack, N. J., writes:

It attacks my young chickens and drives them from their food. (February 5, 1884. Present about fourteen years.)

SUMMARY OF THE QUESTION OF SPARROW *versus* NATIVE BIRDS.

The foregoing examples of evidence have been taken exclusively from original contributions, although numerous equally strong testimonials will be found among the material reprinted from various publications and from both American and foreign sources. There seems, then, to be no possible escape from the conclusion that the Sparrow exercises an important and most harmful influence on our native birds. It is not claimed that in all cases where native birds have become less abundant, or have entirely disappeared from town or farm, the Sparrow is the cause. On the contrary, we know positively that there have been marked changes in the numbers and kinds of birds visiting certain districts, under such circumstances that it is impossible to attribute these changes to the influence of the Sparrow. The settlement of a country frequently causes great changes in its bird life. The rapid growth of towns and cities, without a corresponding increase in parks and gardens, has done much to diminish the number of birds. Cats, small boys, feather hunters, and similar agencies have aided in the war of extermination. The Bobolink breeds much less abundantly in New England now than it did twenty-five years ago, but this is well known to be due partly to the introduction of mowing machines and the cutting of hay much earlier in the season than formerly, and partly to the wholesale destruction of the species during its migrations. But the fact that *all* disappearances of native birds from town or country can not be charged to the Sparrow in no way lessens its responsibility for such changes as it unquestionably has caused.

On the other hand, many of the most stalwart champions of our native birds are not altogether free from blame for their partial disappearance. In how many cities of the Union were native birds carefully protected and encouraged to build their nests before the introduction of the Sparrow? It is certain that in many cities hundreds or even thousands of boxes were provided for the introduced Sparrows, where scarcely a dozen had been given to native birds.

In many cases this superabundance of nesting places so suddenly provided will account for the actual increase of native birds in spite of the presence of the Sparrows; and such cases have naturally misled many candid observers, who recognized the facts without considering all the conditions. As bearing on this point we cite a part of Dr. J. A. Allen's remarks before the Nuttall Ornithological Club, at a meeting held in Cambridge, Mass., early in 1878. All of Dr. Allen's remarks were of great interest and value, and should be read with care by every one interested in the Sparrow question. We quote here from the report printed in the Boston Evening Transcript of March 19, 1878, but select only the parts referring to the Sparrow's relations to native birds:

Mr. J. A. Allen stated that although he had hitherto purposely kept out of the Sparrow controversy, it had not been from any lack of interest in the subject. He had believed the question to be not so one-sided as many have assumed—that the Sparrows are not quite such unmitigated pests as they have sometimes been represented to be, nor, on the other hand, quite so unalloyed a benefaction as some have claimed. While they have some good points, they are certainly not lacking in bad ones. Before taking sides on a question of so much importance, he had waited for the accumulation of evidence; in other words, till the Sparrows had so increased in numbers that our knowledge of their proclivities would enable us to judge of the results of an experiment that at first seemed praiseworthy. The Sparrows, it is true, came to us with a bad name, and many a wise one on the other side of the Atlantic had warned us of the consequences of what they had termed an act of folly. * * * Having had his attention called of late rather strongly to the subject, Mr. Allen had been led not only to collect his own observations on this subject, but to seek information from localities beyond his own immediate vicinity; and on weighing the evidence had been rather surprised at the preponderance of facts unfavorable to the Sparrows. * * *

The destruction of a few caterpillars he regarded as almost the sole good that can be adduced in their favor. Their presence in small numbers, and especially in winter, is indeed cheery and pleasant; but, when in force, their harsh chatter becomes a positive nuisance, and even in summer renders the notes of other birds singing in neighboring trees almost indistinguishable. In regard to the unfavorable side of the score, the list of charges is a long one, and the greater part are too well attested to admit of reasonable doubt.

First in the list is their unfavorable influence upon our native birds. Ordinarily, so far as his observations extend, he believed that they were not violently aggressive, but readily became so whenever there was a conflict of interest and occasionally without provocation. The little Chipping Sparrows commonly associate with them on terms of intimacy and harmony, and rarely had he seen them pursue or attack other birds when meeting with them at a distance from their own domiciles. But that they do, by their abundance and petulance, tend to crowd out and supplant our native birds seems nearly unquestionable, since the latter disappear wherever the House Sparrows become abundant. Upon such species as have a preference for nesting sites similar to their own, they do exert, however, a most positive influence. These are Bluebirds, White-bellied Swallows, Purple Martins, and Wrens—birds of attractive ways, agreeable notes, and highly insectivorous in their diet. When the Sparrows were first introduced into Cambridge, probably at least a dozen bird-houses were put up to each pair of Sparrows. The result was that the native species just mentioned found abundant nesting places, and at once became more numerous than formerly. As the Sparrows rapidly increased, they very naturally possessed themselves of the bird boxes and forced their former occupants elsewhere. He cited the following instances as having fallen under his observation: Three years ago no less than three pairs of Wrens and as many pairs each of Bluebirds and White-bellied Swallows raised their young in boxes in sight of his windows. The following year about one-half disappeared, and last year not one of these nine pairs of native birds had a representative left within this small area. Not that all the boxes were occupied by the Sparrows, but they claimed possession of all, and by force of numbers retained it. In most cases the former occupants, finding their homes already in the possession of their enemies, appeared to make no struggle to regain them, a reconnaissance of the field apparently satisfying them of the hopelessness of any such attempt; in other cases they were not given up without long and and hard-fought battles. On inquiry he found that similar incidents have been observed in neighboring parts of Cambridge. Besides this, instances of uncalled-for aggression had come to his notice, one of which he himself had observed. Last year a colony of Sparrows, not content with three times as many boxes as they had use for—to gain possession of which they had dispossessed wrens and swallows—attacked a pair of Robins that very unwisely, as it proved, had chosen a nesting site in an elm close to this pugnacious colony, by which they were so persistently harassed that they had to abandon their completed nest and its, to them, precious contents.

One error into which many observers who are not ornithologists have fallen lies in the failure to discriminate between the abundance of birds in towns and cities in time of *migration* and in the *breeding* season. Thus such a visitor to the national capital during the first week in April, 1887, would have been struck at once with the number of Robins in all the parks, and might have come to the hasty conclusion that therefore the English Sparrow had no serious influence on them.

There were undoubtedly many thousands of Robins in the city of Washington at that time. On the grass ground in front of the Smithsonian Institution, on the lawns of the Capitol, and in many of the other parks, hundreds were in sight at once, and they seldom appeared to be molested by the Sparrows. But no sooner had these migrating flocks passed northward and the intending settlers arrived in smaller numbers from the South than the Sparrows began to show their natural disposition, and, as a result, the Robins which remained and nested in the beautiful parks, numbering hundreds of acres, probably did not average one pair to every ten acres of suitable ground.

One other egregious blunder, for which there is still less excuse, is the claim so often put forward that in other countries, notably in England and Germany, the Sparrows live in peace with all birds, whereas if they were the terrible foes represented they would have expelled all these birds long ago. In general, such statements may be set down at once as totally untrue as regards the facts. The Sparrow in Europe is very much the same bird as in the United States, certainly no better. And wherever there is any marked difference in habits such a difference is usually attributable to the fact that the conditions of existence are entirely unlike. On this point Dr. Elliott Coues says:

> In Europe these birds are part and parcel of the natural fauna of the country. They are not, as I understand, petted, pampered, and seduously protected from their natural enemies, as they are here. They shift for themselves, find certain sources of

food supply, have a fair share of natural enemies, and are kept within due bounds of multiplication by natural causes; so that the "balance of power," to use a political phrase, adjusts itself. In short, they have their useful part to play, and they play it; they have their natural checks, and their increase is naturally checked. (American Naturalist, Vol. XII, p. 500, Aug., 1878.)

In many parts of Europe bounties have been paid on the Sparrow from time to time for centuries, and to-day in many sections of England the farmers are fighting this pest as bitterly as in any section of the New World. If any one doubts that the Sparrow attacks other birds in Europe, let him turn to the evidence given before the select committee of the British Parliament in 1873, and read the statements which support the testimony of Col. Champion Russell with regard to the relations of the Sparrow and the martin. His conclusion is, "If people will neither protect the martins from the Sparrows nor let them build near their doors and windows for protection, we shall lose these beautiful and most useful birds; indeed, we are losing them fast. Unlike most other birds, they will not make their nests far from our dwellings; if not allowed to build there, they disappear."

RELATION OF THE SPARROW TO INSECTS.

GENERAL SUMMARY OF EVIDENCE.

The vexed question of the insect-eating habits of the Sparrow is one of the most important ones to be decided, and on the decision many persons would rest their arguments for or against the bird.

It has been shown that the Sparrow is decidedly injurious to grain, seeds of various kinds, and fruit; that it causes a decrease in the number of native birds in gardens and on farms, as well as in cities and towns; and that it is a serious nuisance in many ways. But, if it could be shown that it habitually consumes large numbers of injurious insects, there might still be some ground for continuing to protect it, or at least for refraining from its wholesale destruction.

In the effort to obtain sufficient evidence to settle this question no trouble has been spared, and every scrap of testimony submitted has been carefully considered.

Particular pains have been taken to obtain every possible fact favorable to the bird, and the utmost care has been taken to exclude no item of this kind, while in doubtful cases the Sparrow has always been given the benefit of the doubt. Yet, unfortunately for this bird, the result shows plainly that it is *not* a habitual insect-eater, that it does *not* prefer insect food, and that it seldom produces any perceptible effect on the numbers of any species of injurious insect.

We are well aware that these conclusions will be questioned by some friends of the bird, either too busy or too prejudiced to examine the evidence for themselves, but we believe that no candid person can examine carefully all the evidence printed herewith and fail to be convinced of the justice of the verdict. Much favorable evidence has been submitted, and it leaves no doubt that Sparrows generally carry some insects to their young; that the young after leaving the nest continue to eat insects for a time, and occasionally even when fully adult. Instances are given where the Sparrow has done good service by destroying large numbers of the army-worm, cabbage-worm, canker-worm and other span-worms, as well as grasshoppers, and some other insects; but these are exceptional cases, readily accounted for when all the circumstances are known, and showing, in most instances, not that the Sparrow is habitually insectivorous, but that it follows the rule which Prof. S. A. Forbes has indicated for many other seed-eaters, viz, that when suitable insects are extraordinarily abundant these birds substitute insect food to some extent for their more natural diet of seed and grain.

Except when feeding the young, Sparrows can scarcely be said to have any *habit* in relation to insects. Certain individuals may acquire a taste for certain insects, or even for insects in general, and many Sparrows seem to delight in chasing large winged insects, such as butterflies, grasshoppers, and cicadas, and when their clumsy efforts in this direction are successful they usually, though not always, eat or take to their young the insects captured; but as a rule adult Sparrows which are not feeding young do not hunt for insects, and if they catch them at all, it is only because they chance to come in their way while seeking other food.

The following facts should be borne constantly in mind while studying this question. In the first place, there are many beneficial as well as injurious insects, and the Sparrow does not appear to discriminate between them.

Again, the injurious insects, such as span-worms and smooth caterpillars, which the Sparrow *sometimes* destroys in numbers, are precisely such insects as are *always* acceptable to other birds; while there are many other injurious insects, such as hairy caterpillars, which the Sparrow *never* touches, but which some other common birds devour greedily. As almost all these native birds have been lessened in numbers, or entirely driven away from places where Sparrows are abundant, the bearing of these facts is obvious.

Finally, there is no species of injurious insect that the Sparrow has been known to destroy, even in small numbers, which is not much oftener devoured by native birds. Thus the Sparrow does no kind of beneficial work as an insect destroyer which would not be much better done by native birds; while its presence prevents other birds from accomplishing many kinds of work which the Sparrow does not undertake at all.

The reply so often made to this argument, namely, that native birds never would stay in towns as the Sparrow does, shows the most pitiable ignorance of facts. In most towns where there is vegetation subject to the attacks of insects, native birds are sure to be found unless driven away by the Sparrows. If there be but one or two trees in the heart of a city, there is no need to depend upon birds, native or imported, to keep them free from insects; if there are many trees, then many native birds will nest there if they are properly encouraged. Had one-tenth the care been devoted to native birds in Boston, Philadelphia, and New York that was wasted on the imported Sparrows, it is not probable that the span-worm would ever have stripped the trees in those cities, or that the hairy larva of the tussock-moth, or the equally destructive web-worm, would have followed when the span-worm was lessened in numbers.

That the steady and alarming increase of these hairy worms is largely, if not mainly, due to the presence of the Sparrow and the consequent absence of better birds is not open to doubt. The testimony of Prof. C. V. Riley, Entomologist of the U. S. Department of Agriculture, of Prof. J. A. Lintner, State Entomologist of New York; and of Dr. John L. LeConte, of Philadelphia, is conclusive on this point. A part of this testimony is given a few pages further on, and the remainder will be found in Professor Riley's report which follows.

Before proceeding further with this discussion, it will be well, as under previous sections of this Bulletin, to give a brief résumé of the evidence collected, and on which the conclusions as regards the Sparrow's relations to insects are based.

This evidence may be roughly divided into two classes:

I. Evidence derived mainly from study of the contents of Sparrows' stomachs.

II. Evidence derived mainly from observation of the bird, without subsequent examination of the stomach.

EVIDENCE DERIVED FROM STUDY OF THE CONTENTS OF SPARROWS' STOMACHS.

Under this head is included all available published data derived from dissection in both Europe and America, and representing in all about two thousand five hundred stomachs.

Of this number, about eleven hundred are from European sources and the remainder from the United States and Canada. With the exception of data relating to upward of five hundred stomachs examined at the Department during the past year, very few of these records are as complete as could be desired, and no attempt has been made to tabulate the results of all the dissections, but it may be stated that among two thousand four hundred and fifty-five stomachs only three hundred and forty-five, or about 14 per cent., showed any insect remains. In the case of five hundred and twenty-two stomachs examined at the Department of Agriculture all necessary data were obtainable and the results have been carefully tabulated. The insect remains contained in these stomachs were critically examined under the direction of Prof. C. V. Riley, who has kindly prepared a report upon the subject, and has added thereto the results of his study of published data of other dissections and of his own large experience with the Sparrow.

This valuable report of Professor Riley covers the ground so thoroughly, that there is no excuse for our entering into any extended discussion of the facts brought out by these dissections, and we shall merely touch on one or two points to give emphasis to some of our remarks later.

EVIDENCE DERIVED FROM OBSERVATION OF THE BIRD.

That part of the testimony which is based mainly on observation, with only an occasional dissection, is much less positive as a whole than that based solely on dissection; but some parts of it are extremely valuable nevertheless.

In reply to the schedule questions sent out, and by subsequent correspondence with all persons willing to contribute information, reports were received from five hundred and ninety-one persons. The contents of these reports may be roughly classified as follows:

Mainly favorable to the Sparrow	267
Mainly unfavorable to the Sparrow	138
About equally divided	60
Indefinite, or of no practical value	126
Total	591

Of the one hundred and twenty-six reports counted of no practical value, seventy-eight consist simply of the statement that the Sparrow eats insects only when forced to do so by the absence of other food.

As a majority of all observers were naturally unable to discriminate between injurious and beneficial insects, all reports which credit the Sparrow with *eating insects of any kind* have been considered (in this summary) *favorable* to the Sparrow, though, in view of Professor Riley's examination of insects actually eaten, this is far from being really the case.

The following table shows the insects which the Sparrow is said to eat and the number of observers reporting each insect. With the exception of single reports on six or seven species, it does not record results of dissection, but merely the observations of those who report having seen the Sparrow taking insects for itself or young. In this list there are no repetitions, that is, the same insect is not entered in two separate categories. For example "worms," fifty-six reports, does not include cut-worms, canker-worms, earth-worms, etc., which are recorded just as reported.

List of insects said to be eaten by the Sparrow.

Kind of insect.	No. of reports.	Kind of insect.	No. of reports.
Ants:		Gnats	3
Red	1	Grasshoppers, kind not specified	52
Winged	1	Grubs or larvæ, kind not specified	50
Kind not specified	4	*Harpalus vagans*	1
Ants-eggs	1	Honey bees	2
Aphidæ	2	*Hyphantria* (moth)	2
Apple-tree worms	3	*Hyphantria* (larva)	1
Army-worm	9	Ichneumon flies	5
Bag-worm	1	Insects:	
Beetle:		On maples	1
Tiger (*Cicindela*)	1	On trees	2
Goldsmith	1	In wheat	1
Beetles: Kind not specified	10	Kind not specified	118
Blow-fly	2	Insect eggs	5
Bot-fly	4	June-bug	1
Borers	1	June-bug (larva)	1
Buffalo-moth	1	Katydid	1
Bugs:		Larvæ of—	
From elm bark	1	House-fly	1
From cherry tree	1	Stable-fly	1
Kind not specified	18	Various flies	1
Butterfly (*turnus*)	1	Moths	1
Butterfly:		Leaf-rollers of plum	1
Vanessa	1	Leaf-rollers, kind not specified	1
Yellow	1	Locusts	4
Butterflies, kind not specified	14	Maggots from dead animal	1
Butterfly larvæ	1	May-bug	2
Cabbage-butterfly	2	May-bug larvæ	2
Cabbage-moth	2	May-flies	4
Cabbage-worms	39	Measuring-worms	8
Canker-worm	26	Measuring-worm moth	1
Carabidæ	1	Melon bugs of all kinds	1
Carabid larvæ	1	Mosquito	3
Caterpillar:		Moth, *luna*	1
Fall	1	Moth, *Cecropia*	1
Grape-vine	1	Moths or millers, kind not specified	35
Smooth	3	*Muscidæ*	1
Tent	3	*Orgyia* (moth)	1
Tree	3	*Orgyia* (larvæ)	3
Kind not specified	53	Orthoptera	1
Cherry-tree worms	1	Potato-bug	1
Chinch-bug	1	Potato-bug larva	1
Clear-winged flies from grape	1	Rose-bug	1
Cicada:		Rose-slugs	1
Seventeen-year	11	Scale insects	1
Kind not specified	6	Slugs	2
Coccinellidæ	1	*Sphinx carolina*	1
Codling-worm	1	Spiders, kind not specified	26
Codling-moth	2	Squash-bugs	1
Coleoptera (larva)	1	Tobacco-worm	1
Crickets	2	Tree-lice	1
Curculio of plum	1	Wasp	1
Currant moth	1	Weevils	2
Currant worm	4	White-ants (*Termes*)	2
Cutworm:		Worms on—	
Bronzy	1	Fruit-trees	1
Kind not specified	6	Elm	2
Dragon-flies	2	Linden	1
Dung-insects	2	Maple	4
Earthworms	7	Pear-tree	1
Flea-bugs	1	Worms:	
Flies:		Red	1
Horse	2	Small green	1
House	3	Tree	1
Stable	1	Kinds not specified	56
Small, black	1		
Kind not specified	25		

In this list there are a dozen or more items which are conspicuous from the number of witnesses reporting them. Thus army-worms, canker-worms, and cabbage-worms aggregate seventy-four reports; caterpillars alone are mentioned in sixty-four reports, and "worms," many of which are undoubtedly caterpillars, in eighty-eight more. Fifty observers speak of grubs or larvæ; fifty-two of grasshoppers; and then we have moths, millers, and butterflies with fifty-nine; flies, thirty-two, beetles, twenty-seven, and spiders, twenty-six; while, lastly, one hundred and eighteen reports state that the Sparrow eats "insects," but fail to specify the kinds.

Unquestionably the information in many of these reports is of little consequence. It is assumed to be in most cases the result of personal observation, but many of the reports contain internal evidence that the information is derived from other sources, while still others appear to be hasty inferences from entirely insufficient data. But the same might be said for many of the reports relating to the Sparrow's relations to native birds, with the difference, however, that the names and habits of insects are less commonly known than those of birds, while the small size of many insects is apt to lead a careless observer to believe that the Sparrow, when searching on the ground and picking up anything too small to be readily seen, is always eating insects.

ARGUMENT FROM ALL AVAILABLE DATA.

The fact that more than a hundred observers state that they have never seen a Sparrow touch even a single insect is certainly surprising, and can only be explained by one of two hypotheses: either they are not close observers, or their opportunities for observation have been limited. Certainly when suitable insects are abundant, Sparrows usually take considerable numbers to their young; yet it is equally certain that in our large cities thousands of Sparrows are reared annually without ever tasting insects. When bread, cooked meat, or other soft food is obtainable the old birds are content to give the young such food, and even when insect food is fairly abundant it is not always utilized. Thus Colonel Russell states that in England he once examined the stomachs of forty-seven nestling Sparrows taken at one time from one farm yard, and found the remains of but six small insects in the entire lot, the crops in most cases being filled with green peas and grain. On the other hand Dr. Schleh, professor in the College of Agriculture at Herford, Germany, after examining "the crops of a large number of nestling Sparrows sent to him from different parts of the country," finds that "while in the nest, and for a week after leaving it, their food consists *entirely* of insects, grubs, etc. Two weeks after leaving the nest their food still consists of forty-three per cent. of animal food; a week later of thirty-one per cent., and after that age of only nineteen per cent. of animal ingredients." Unfortunately we do not know the number of dissections on which these figures are based, but they are far more favorable to the Sparrow than any others we have seen, and can scarcely be regarded as nearer the average than the above figures of Colonel Russell, which perhaps indicate the other extreme.

In this connection some of the data afforded by the five hundred and twenty-two dissections made at Washington during the past summer are of interest. Three hundred and thirty-eight were the stomachs of birds taken on the grounds of the Department of Agriculture, almost all of them shot between noon and 2 o'clock p. m., and when not engaged in searching the driveways for refuse. These grounds consist of about thirty-five acres of grass, shrubbery, trees, and gardens; and form one section of the unbroken series of parks which extends from the Capitol to the White House, a distance of more than a mile. Here at all times during the summer large numbers of insects were to be had without any particular search, and hence these three hundred and thirty-eight stomachs ought to contain a larger percentage than usual of such food. The remaining one hundred and eighty-four stomachs came from various places at a distance, and the data accompanying them are not complete in all cases, but many were collected in places where insects were abundant. Three hundred and seventy-six of these stomachs were from adult birds, and fifty-four of them, or fourteen and two-tenths per cent., contained remains of insects. One hundred and two were from birds classified as "immature"—that is, they were at most only two or three months old, but were fully fledged, and no longer under the care of the parents. Twenty-two of these, or about twenty-one and one-half per cent., contained insect remains. Forty-four were either nestlings or at least still under the care of the parents, and seventeen of these, or thirty-eight and six-tenths per cent., contained some insect food. This confirms in great measure the generally accepted theory that young Sparrows eat many more insects than adults, but it should be remarked that very few of these five hundred and twenty-two stomachs contained any large number of insects. Certainly the average percentage of insect food would not exceed one or two per cent., while even in the forty-four young birds not more than ten per cent. of the entire food was insects. Moreover, in one or two cases, young Sparrows *taken from the nests* contained no trace of insect food, but *did* contain crushed or softened grain, probably from horse droppings. Dr. B. H. Warren, at West Chester, Pa., and Mr. C. J. Maynard, in Boston, had similar experiences, and there can be no doubt that insects are not essential even for feeding the young. Many persons suppose that when Sparrows are busy at horse droppings in the streets they are looking for insects, but of course they are really picking out the partially digested grain, and this grain is perfectly adapted to the wants of young Sparrows, even when just hatched. An occasional insect may be picked up in the same places, but such insects are usually small dung-beetles which are useful, or at least not harmful species. It is probably safe to say that as a rule nine-tenths of the food of city Sparrows—so long as they remain within city limits—is derived from horse droppings, and most of the remainder is house refuse. In the parks or on the outskirts of cities, in small towns, and in the country, Sparrows undoubtedly take more grain or seed, fruit, and insects; and all careful observers whose observations have extended over considerable periods in such localities, agree that the Sparrow destroys insects more or less according to their abundance.

SEASONAL VARIATION IN THE INSECT FOOD OF THE SPARROW.

It has been claimed often that Sparrows take much the larger part of their insect food in spring or early summer. While this may be true, we have not the data as yet to prove it, and it seems to be, in part at least, a hasty inference from two principal facts. These are, first, the assumption that the young are fed mainly on insects, and that the most young are hatched in spring and early summer; second, the supposition that as grain ripens, Sparrows naturally neglect all other food. Undoubtedly both these points have considerable weight, but there are two other points that tend to offset them, and these are too frequently overlooked. Although doubtless more Sparrows are hatched in May or June than in July or August, yet we do not know how many more. It has been shown already that at least three or four broods are hatched each year, and during the last week in August, 1887, stump-tailed young just out of the nest were not at all rare about the grounds of the Department of Agriculture. If nearly as many young are reared in August as in May, probably as many insects would be fed to them in August as in May, for—and here is the second point—insects are certainly more abundant in midsummer and early autumn than in spring.

In England, according to Mr. Gurney's tables, the Sparrow eats more insects in August than in any other month; and Dr. William Brodie, at Toronto, Canada, found that of 85 stomachs taken in September, 63, or about 74 per cent., contained insects.

The following table gives the results, as regards the number of stomachs containing insects, of the 522 dissections made at the Department of Agriculture, arranged by months.* It is to be regretted that as many birds were not killed each month as in August, but this was impossible, although it is hoped it may be done hereafter.

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* For information as to the manner in which these examinations were made, see page 133.

Table showing, by months, the number and percentages of Sparrows containing insects, in a total of 522 dissections.

	Washington, D. C.	Other localities.	Total examined.	Total with insects.	Percentage with insects.
January:					
Examined	0	2	2		
Contained insects	0	0		0	0
February:					
Examined	0	17	17		
Contained insects	0	0		0	0
March:					
Examined	0	21	21		
Contained insects	0	1		1	4.8
April:					
Examined	1	24	25		
Contained insects	0	1		1	4.
May:					
Examined	11	10	21		
Contained insects	5	1		6	28.6
June:					
Examined	43	4	47		
Contained insects	12	1		13	27.7
July:					
Examined	37	24	61		
Contained insects	6	3		9	14.8
August:					
Examined	213	20	233		
Contained insects	53	7		60	25.8
September:					
Examined	29	15	44		
Contained insects	2	0		2	4.5
October:					
Examined	1	24	25		
Contained insects	0	0		0	0
November:					
Examined	2	15	17		
Contained insects	0	0		0	0
December:					
Examined	1	8	9		
Contained insects	0	0		0	0
Totals			522	92	17.6

These results, unsatisfactory as they are, show conclusively that before any general rule can be laid down respecting the insect food of the Sparrow in its relation to season, it will be necessary to examine much larger numbers of stomachs, and to note particularly, in addition to the date and locality, such facts as the age of the bird, the time of day when killed, the character of the place where killed, as well as the apparent abundance or scarcity of food of any particular kind.

Among the five hundred and ninety-one reports which are not based on dissection, probably there are one hundred and fifty or more which have been carefully prepared, give the results of actual observation, and hence contain valuable information.

In Professor Riley's report will be found a list of some of the most valuable and suggestive of these contributions, which should be read in full in order to appreciate the facts. At least two-thirds of them contain facts more or less favorable to the Sparrow, but, as stated already, these are readily accounted for when all the circumstances are known.

RELATION OF THE SPARROW TO CATERPILLARS.

Professor Riley, in his report, has called attention to several points of interest in these contributions, and has also given an interesting letter of his, written to Dr. Coues in 1878, relating to the agency of the English Sparrow in increasing rather than diminishing the numbers of hairy caterpillars, especially of *Orgyia* and *Hyphantria*, in the city of Washington.

In the annual report of the Department of Agriculture for 1886, we published similar conclusions as regards *Orgyia*, derived from the independent observations of Prof. J. A. Lintner, State Entomologist of New York. We again publish these extracts from Professor Lintner's report, as they are of great interest and importance, especially as they mention some of the native birds which undoubtedly held the *Orgyia* in check before the advent of the English Sparrow.

Relation to the caterpillar of the Tussock Moth.—Professor Lintner says: "The extraordinary increase of the *Orgyia leucostigma* is owing to the introduction and multiplication of the English Sparrow.

"This may seem a strange statement, in consideration of the fact that the Sparrow was imported from Europe for the express purpose of abating the 'caterpillar nuisance' in New York and some of the New England cities. . . . The increase of the *Orgyia leucostigma* commenced and has continued to progress with that of the Sparrow.

"A remark made to me that the caterpillars had been observed to be very numerous in localities where the Sparrows also abounded induced me to undertake to verify or disprove the idea that had suggested itself to me, that the Sparrow afforded actual protection to the caterpillars and promoted their increase.

"In a locality in the city of Albany, N. Y. (intersection of Broadway and Spencer street), which I had traversed daily during the preceding year, I had been interested in watching the habits of a large company of Sparrows which had established themselves in quarters evidently in every way suited to their tastes and wants among the vines and leaves of a large woodbine (*Ampelopsis quinquefolia*), which covered with a dense matting nearly the entire side of a large dwelling. Here I had observed a greater number of the Sparrows than elsewhere in the city. They were still local and far from being generally distributed.

"Upon visiting this locality for the purpose above mentioned, I found upon the other side of the building, and on an adjoining one, three other large woodbines not before noticed by me, making five in all. On a tall pole standing between the two buildings a very large Sparrow house with many compartments had been erected, and many smaller ones had been placed among the branches of the trees. The woodbines seemed alive with the Sparrows. Hundreds were issuing from them and dropping down to their favorite stercoraceous repasts in the streets, and the air was vocal with their chattering. It was a rare bird exhibition.

Here certainly was a test case of the insectivorous nature of the Sparrow.

"On the sidewalk in front of the two buildings two large spreading elms (*Ulmus Americanus*), standing between some maples, showed *every leaf eaten from them*, disclosing the nesting-boxes among their branches, and their trunks and limbs dotted thickly or clustered with the easily recognized egg-bearing cocoons of the *Orgyia.* Hundreds of immature caterpillars were traveling over the trees, fences, and the walls adjoining. No better evidence of the almost perfect immunity afforded to the caterpillars from their enemies, whether birds or insects, by the presence of the Sparrows, could possibly be given.

"A portion of Broadway, between Clinton avenue and the Central Railroad crossing, was also known to abound in the Sparrows, the citizens resident there having fed them most generously, not only during the winter season, but also in the summer months. Nesting-boxes had been placed for them in most of the trees. Here the trees presented a pitiable sight. Many of the elms and horse-chestnuts were entirely stripped of their foliage; the naked ribs of the leaves of the latter seemed ghastly in their suggestion of fleshless fingers. Nowhere else in the city had I seen such ravages.

"Passing thence to Pearl and State streets, the same association of Sparrows, caterpillars, and their destructive work was seen. Clinton Square, where the Sparrows had, in their introduction into the city, been specially taken under the care and protection of the residents on the east side of the park, afforded another excellent test. It was evident that the Sparrows were in full appreciation of their privileges from the almost incredible numbers sporting about the trees. Their protégés were also in full force. Caterpillars and their cocoons met the eye everywhere, while hanging from the rails and caps of the iron fence surrounding the park were the dead and decomposing bodies of caterpillars killed by the recent heavy rains (often so fatal to insect larvæ), in such numbers that they tainted the air in their vicinity.

"It seems unnecessary to extend this record further than to add that in other sections of the city observations made were in accord with the above.

"*How the Sparrows protect the caterpillars.*—That the Sparrows decline to eat the Orgyia caterpillar is not a charge against them. They *could not eat* them with impunity. The diet would doubtless prove fatal to them. The charge to which they are amenable is this: By the force of numbers, united to a notoriously pugnacious disposition, they drive away the few birds that would feed upon them. Of these we know but four species, viz, the Robin (*Merula migratoria*), the Baltimore Oriole* (*Icterus galbula*), the Black-billed Cuckoo (*Coccygus erythropthalmus*), and the Yellow-billed Cuckoo (*Coccygus americanus*).

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* This bird has been seen with its head thrust into the web-nest of the tent caterpillar, eagerly devouring its occupants.

"The above species seem, in the ordering of nature, to have been assigned to us for protection from an undue multiplication of a large number of hairy caterpillars of injurious habits. * * * One of them, the Yellow-billed Cuckoo, is known to shave off the hairs of the *Orgyia leucostigma* caterpillar before swallowing it. The following account of the operation is from Dr. LeBaron, former State Entomologist of Illinois: 'My attention was attracted to a Cuckoo regaling himself upon these caterpillars, which were infesting in considerable numbers a larch growing near the house. My curiosity was excited by seeing a little cloud of hair floating down upon the air from the place where the bird was standing. Upon approaching a little nearer I could see that he seized the worm by one extremity, and drawing it gradually into his mouth, shaved off as he did so, with the sharp edge of his bill, the hairy coating of the caterpillar and scattered it upon the wind.'" (Second Report on the Injurious and other Insects of the State of New York, by J. A. Lintner, Albany, 1885.)

Relation to the canker-worm and other span-worms.—As early as 1874 Dr. John L. LeConte, of Philadelphia, Pa., published* the following in regard to the disappearance of the span-worm in that city and its replacement by another species:

"In Philadelphia, and probably in other cities, the Geometride (*Ennomos subsignaria*), which was very injurious to the shade trees growing in the streets, has been exterminated by the European Sparrows, introduced for that purpose. With the disappearance of the Geometride a Noctuide, *Orgyia leucostigma*, commenced to increase, and has now in some streets become almost as great a nuisance as the *Ennomos* had been. The larvæ of the Orgyia, whether protected by some disagreeable odor, or more probably by the stiff hairs with which they are covered, are not eaten by the Sparrows, and therefore increase without molestation."

We must demur somewhat to the above statement of Dr. LeConte that the English Sparrow exterminated *Ennomos* in Philadelphia. That the Sparrows contributed their mite to this end there is no doubt, but other span-worms have disappeared in the same way from towns and villages where there were no Sparrows, and it is now known that such disappearances are of more or less regular occurrence, and may be due to various causes, such as the multiplication of the insect parasites of the worms, the prevalence of disease, or even in part to the very fact of the extreme abundance of the worms themselves.

In New England the span-worm which defoliated the elms of the cities and the apple orchards of the country was the canker-worm (*Paleacrita vernata*), and from different parts of New England unimpeachable testimony has come as to the good work done by the Sparrow in feeding on this worm. We ourselves have seen thousands of these worms carried off by the Sparrows every day, yet are bound to say that there was no appreciable diminution in the number of worms, and earlier in the season, when the wingless moths were depositing the eggs for this devastating army, the Sparrows were never detected eating the moths at all, though the robins fed on them constantly. Moreover, the nature and habits of this worm make it not only possible but easy to completely prevent or control its depredations. (See Professor Riley's letter to Dr. Coues in the report which follows.)

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* Proc. A. A. A. S., Vol. XXIII, p. 44.

Furthermore, the female, being wingless, does not wander far after issuing from the pupa, and the worms, when very abundant, after stripping one orchard or row of trees, are too small to travel far in search of more and yet too small to complete their transformation without more food. Thus this state of affairs frequently brings about the extinction of almost the whole army

It has been remarked frequently by observant persons that the disappearance of the canker-worms and similar caterpillars is very sudden. One year an orchard or park may be overrun by them, and the next season it may be impossible to find any at all. It is a well-known fact that excessive multiplication often weakens an entire race, and then when attacked by the multitudes of parasites which have increased with it, or by disease which has been slowly advancing, it is unable to resist, and a wholesale reduction in number is the result. A few days of heavy rain, an unusual period of drought, a few hours of excessive heat or cold, should these conditions occur at the critical point in the career of a species, may so reduce its abundance that it will not regain its former numbers for a dozen years or even more; and if meanwhile this turn of Fortune's wheel has given another species the ascendant in the same district, the subsequent struggle may be prolonged indefinitely. We do not *know* that any such crises were imminent in Philadelphia at the time the Sparrows were first introduced there in numbers, but with our present knowledge of the Sparrow's habits we believe that the results there are far more likely to have been reached through some such combination of circumstances than through the comparatively insignificant number of worms devoured by the Sparrows.

The following report by Professor Riley on the insect food of the Sparrow is a most valuable contribution to our knowledge of the food habits of the species, and a careful study of this report, and of the tables which follow it, will do much to dispel the illusions of those who class the Sparrow among beneficial birds on account of its insectivorous habits.

INSECTIVOROUS HABITS OF THE ENGLISH SPARROW (Passer domesticus).

By C. V. RILEY.

REPORT OF MATERIAL EXAMINED IN 1887.

The facts contained in this report are based upon the stomach contents of the English Sparrow submitted by Dr. C. Hart Merriam for examination and opinion, these having been separated by him from a much larger number (522 in all) examined in the Ornithological Division and found to contain no insects. By stomach contents is included not only what is taken from the crop, but also that taken from the gullet and the mouth. I have first given a list of the specimens examined according to Dr. Merriam's card catalogue number and including the insect material examined and identified. Next I have given a succinct statement of the habits of the insects concerned, arranged according to orders, and finally a summarization of the results, and a survey of other work in the same line both in Europe and America.

My method of examination has been, first, to have the material carefully examined by some one of my assistants according to their special knowledge, and particularly by Mr. Otto Lugger and Mr. Th. Pergande, and then to verify their determinations and to study and determine more closely whatever was questionable or undeterminable. In this way the accuracy of the determinations has been fully assured, and I have not been under the necessity of appealing to specialists outside of the Division. A determination is sometimes based on a mere fragment, and in all cases where an interrogation still remains it is because of the imperfect condition of the specimens, which would make specific reference little more than guess-work. To the gentlemen mentioned, as also to Mr. Barrows and Dr. Fisher, of the Division of Ornithology, I take this occasion to express my thanks for aid and interest shown in the work.

STOMACH CONTENTS.

No. 16.—Young male; July 7, 1885, Sing Sing, N. Y. Contents: Two chrysomelid larvæ (small larvæ of unrecognizable species).

No. 97.—Adult female; July 25, 1885, Sing Sing, N. Y. Contents: One snout-beetle (*Sphenophorus zeæ*); wings of a small Chrysomelid, and jaws of a caterpillar.

No. 123.—Adult female; July 28, 1885, Sing Sing, N. Y. Contents: Remains of a small hymenopterous insect and pieces of one *Aphodius* sp.

No. 152.—Young male; August 4, 1885, Sing Sing, N. Y. Contents: Three Hymenoptera (*Myzine* 6-*cincta*); one large locust (*Caloptenus differentialis*); two pupæ of small locusts (*Caloptenus* sp.).

No. 195.—Adult male; August 10, 1885, Sing Sing, N. Y., three young Orthoptera, viz, *Xiphidium* sp., *Caloptenus* sp., *Tettix* sp., one *Colaspis flavida*.

No. 196.—Young male; August 10, 1885, Sing Sing, N. Y. Contents: Two snout-beetles (*Sitones* sp.).

No. 201.—Adult female; August 10, 1885, Sing Sing, N. Y. Contents: Very small pieces of a curculionid beetle.

No. 202.—Young male; August 10, 1885, Sing Sing, N. Y. Contents: Pieces of two snout-beetles (*Sphenophorus zeæ*).

No. 216.—Female; August 10, 1885, Sing Sing, N. Y. Contents: One *Aphodius granarius*.

No. 289.—Young male; August 20, 1885, Sing Sing, N. Y. Contents: Small pieces of a hemipterous insect.

No. 1552.—Female; May 9, 1885, Taunton, Mass. Contents: One elytron of *Aphodius granarius*.

No. 1593.—Male; June 16, 1885, Taunton, Mass. Contents: Four large larvæ of a *Lachnosterna* sp. and two small snout-beetles (two heads and tip of one elytron).

No. 2131.—Adult female; August 3, 1886, Washington, D. C. Contents: One snout beetle (*Sphenophorus parvulus*).

No. 2132.—Adult female; August 3, 1886, Washington, D. C. Contents: One arctiid (*Hyphantria cunea*) with eggs; two pairs of jaws of cut-worms (fam. Noctuidæ).

No. 2133.—Adult female; August 3, 1886, Washington, D. C. Contents: One snout-beetle (*Sphenophorus parvulus*).

No. 3360.—Male; March 19, 1886, Sugar Grove, Ohio. Contents: Broken pieces of *Aphodius fimetarius*.

No. 5523.—Adult female; May 2, 1887, Washington, D. C. Contents: Piece of legs of an Ichneumonid; one snout-beetle (*Sphenophorus parvulus*).

No. 5526.—Young male; May 16, 1887, Washington, D. C. Contents: Part of the leg of a *Lachnosterna*; one Hymenopteron (*Tiphia* sp.).

No. 5528.—Young female; May 20, 1887, Washington, D. C. Contents: Several pieces of *Lachnosterna*, apparently *fusca*.

No. 5529.—Young male; May 20, 1887, Washington, D. C. Contents: Several pieces of *Lachnosterna*, apparently *fusca*.

No. 5532.—Young male; May 28, 1887, Washington, D. C. Contents: One spider (*Tarentula* sp.); one snout-beetle (*Sphenophorus parvulus*); two ants (*Solenopsis* sp.); one Hymenopteron (*Tiphia* sp.); one minute Hymenopteron (*Xylaspis* sp.).

No. 5533.—Adult male; May 28, 1887, Washington, D. C. Contents: One snout-beetle (*Sphenophorus parvulus*); one spider (*Lycosa scutellata*).

No. 5536.—Male; June 2, 1887, Washington, D. C. Contents: One snout-beetle (*Sphenophorus parvulus*); five flea-beetles (*Chætocnema denticulata*).

No. 5537.—Female; June 2, 1887, Washington, D. C. Contents: Two spiders (legs), not recognizable; two snout-beetles (*Sphenophorus parvulus*); two flea-beetles (*Chætocnema denticulata*).

No. 5538.—Female; June 2, 1887, Washington, D. C. Contents: Several specimens of snout-beetles (*Sphenophorus parvulus*).

No. 5542.—Female; June 2, 1887, Washington, D. C. Contents: Two pupæ of the blue-bottle fly (*Musca cæsar*).

No. 5544.—Female; June 2, 1887, Washington, D. C. Contents: One snout-beetle (*Sphenophorus parvulus*); pieces of the larva of a Homopteron, apparently *Erythroneura*.

No. 5545.—Young male; June 3, 1887, Washington, D. C. Contents: Pieces of numerous spiders; three snout-beetles (*Sphenophorus parvulus*); one Hymenopteron (*Tiphia* sp.).

No. 5548.—Young male; June 7, 1887, Washington, D. C. Contents: Small pieces of a *Lachnosterna;* one snout-beetle (*Sphenophorus parvulus*).

No. 5549.—Adult female; June 7, 1887, Washington, D. C. Contents: One snout-beetle (*Sphenophorus parvulus*).

No. 5636.—April 21, 1887, Rockville, Conn. Contents: Remains of two beetles (*Diplotaxis* sp. and *Aphodius fimetarius*).

No. 5662.—Young female; June 15, 1887, Washington, D. C. Contents: One flea-beetle (*Chætocnema denticulata*); traces of an Hymenopteron, apparently *Tiphia*.

No. 5665.—Young male; June 16, 1887, Washington, D. C. Contents: One Hymenopteron (only very small pieces).

No. 5676.—Adult female; June 21, 1887, Washington, D. C. Contents: Six houseflies (*Musca domestica*), with numerous eggs.

No. 5693.—Young female; July 12, 1887, Washington, D. C. Contents: One Hymenopteron (only very small pieces, apparently of *Tiphia*).

No. 5701.—Adult female; July 13, 1887, Washington, D. C. Contents: Eleven flea-beetles (*Chætocnema denticulata*); one *Colaspis flavida*.

No. 5705.—Young female; July 13, 1887, Washington, D. C. Contents: One Hymenopteron (*Myzine 6-cincta*).

No. 5712.—Young female; July 14, 1887, Washington, D. C. Contents: One leg of a longicorn beetle (*Liopus* sp.); parts of a Hymenopteron (*Myzine 6-cincta*); legs of a minute Hymenopteron; one leg of a spider.

No. 5713.—Young female; July 14, 1887, Washington, D. C. Contents: Very small pieces of a Hymenopteron (*Myzine 6-cincta*); several flea-beetles (*Chætocnema denticulata*).

No. 5720.—Young female; July 15, 1887, Washington, D. C. Contents: Numerous pieces of Hymenoptera (*Myzine 6-cincta*); traces of a Heteropteron.

No. 5916.—Adult female; August 9, 1887, Washington, D. C. Contents: Two snout-beetles (*Sphenophorus parvulus*).

No. 5917.—Adult female; August 9, 1887, Washington, D. C. Contents: Two snout-beetles (*Sphenophorus parvulus*).

No. 5924.—Young male; August 9, 1887, Washington, D. C. Contents: Many flea-beetles (*Chætocnema denticulata*); legs of a snout-beetle (*Sphenophorus parvulus*).

No. 5940.—Young male; August 11, 1887, Washington, D. C. Contents: One flea-beetle (*Chætocnema denticulata*); traces of a Hymenopteron (*Myzine 6-cincta*).

No. 5941.—Young male; August 11, 1887, Washington, D. C. Contents: One Hymenopteron (*Myzine 6-cincta*).

No. 5945.—Young male; August 12, 1887, Washington, D. C. Contents: One Hymenopteron (*Myzine 6-cincta*).

No. 5946.—Young female; August 12, 1887, Washington, D. C. Contents: Two small Noctuid larvæ; 1 snout-beetle (*Sph. parvulus*); 5 flea-beetles (*Chætocnema denticulata*); 1 *Myzine 6-cincta*.

No. 5951.—Young male; August 12, 1887, Washington, D. C. Contents: One snout-beetle (*Sph. parvulus*); 1 Hymenopteron (*Myzine 6-cincta*).

No. 5953.—Adult female; August 12, 1887, Washington, D. C. Contents: One Hymenopteron (*Myzine 6-cincta*).

No. 5954.—Young male; August 12, 1887, Washington, D. C. Contents: One leaf-hopper (*Erythroneura* sp.)

No. 5967.—Adult female; August 13, 1887, Washington, D C. Contents: One leaf-hopper (*Erythoneura* sp.); 2 ants (*Brachymyrmex heeri*, female).

No. 5970.—Female; August 13, 1887, Washington, D. C. Contents: Three flea-beetles (*Ch. denticulata*); 3 Hymenoptera (*Myzine 6-cincta*).

No. 5971.—Female; August 13, 1887, Washington, D. C. Contents: Two Hymenoptera (*Myzine 6-cincta*); remains of 1 ant.

No. 5972.—Male; August 13, 1887, Washington, D. C. Contents: Pieces of the leg of *Lachnosterna*; 2 Hymenoptera (*Myzine 6-cincta*).

No. 5973.—Young male; August 13, 1887, Washington, D. C. Contents: One leg of mole-cricket (*Gryllotalpa* sp.).

No. 5975.—Young; August 15, 1887, Washington, D. C. Contents: Four ants (*Monomorium pharaonis*); several Hymenoptera (*Myzine 6-cincta*).

No. 5976.—Young; August 15, 1887, Washington, D. C. Contents: Five ants (*Monomorium pharaonis*); 1 Hymenopteron (*Myzine 6-cincta*).

No. 5977.—Young male; August 15, 1887, Washington, D. C. Contents: Small pieces of several Hymenoptera (*Myzine 6-cincta*).

No. 5982.—Female: August 15, 1887, Washington, D. C. Contents: One Hymenopteron (*Myzine* 6-*cincta*).

No. 6000.—Young female; August 16, 1887, Washington, D. C. Contents: One Hymenopteron (*Myzine* 6-*cincta*).

No. 6004.—Adult male; August 17, 1887, Washington, D. C. Contents: Small pieces of a few ants; species not recognizable.

No. 6007.—Young male; August 17, 1887, Washington, D. C. Contents: Very small pieces of a Hymenopteron.

No. 6010.—Female; August 17, 1887, Washington, D. C. Contents: One Hymenopteron (*Myzine* 6-*cincta*).

No. 6012.—Female; August 17, 1887, Washington, D. C. Contents: One Hymenopteron (*Myzine* 6-*cincta*); and 5 jaws of some cut-worm (Noctuid larva).

No. 6015.—Adult female; August 17, 1887, Washington, D. C. Contents: One Lepidopteron (*Hyphantria cunea*).

No. 6018.—Female; August 17, 1887, Washington, D. C. Contents: Two snout-beetles (*Sphenophorus parvulus*); tarsus of a *Lachnosterna*.

No. 6021.—Male; August 18, 1887, Washington, D. C. Contents: One Hymenopteron (*Myzine* 6-*cincta*, male).

No. 6025.—Female; August 18, 1887, Washington, D. C. Contents: Three specimens of bee (*Halictus* sp.); one Hymenopteron (*Myzine* 6-*cincta*).

No. 6026.—Female; August 18, 1887, Washington, D. C. Contents: One Hymenopteron (*Tiphia?*).

No. 6087.—Male; August 19, 1887, Washington, D. C. Contents: Legs of Hymenopteron (Ichneumonid?).

No. 6088.—Young male; August 19, 1887, Washington, D. C. Contents: Many specimens of Hymenoptera (*Myzine* 6-*cincta*).

No. 6089.—Adult female; August 19, 1887, Washington, D. C. Contents: One snout-beetle (*Sphenophorus parvulus*); two small jaws of caterpillar?

No. 6090.—Female; August 19, 1887, Washington, D. C. Contents: Two small bees (*Halictus* sp.).

No. 6091.—Female; August 19, 1887, Washington, D. C. Contents: One Hymenopteron (*Tiphia* sp.).

No. 6092.—Female; August 19, 1887, Washington, D. C. Contents: Two Hymenoptera (*Myzine* 6-*cincta*).

No. 6093.—Female; August 19, 1887, Washington, D. C. Contents: One Hymenopteron (*Tiphia* sp.); one ant (not recognizable).

No. 6108.—Young female; August 20, 1887, Washington, D. C. Contents: Three Noctuid larvæ (*Laphygma frugiperda*).

No. 6109.—Young female; August 20, 1887, Washington, D. C. Contents: One Hymenopteron (*Myzine* 6-*cincta*); one *Psocus* sp.

No. 6110.—Young female; August 20, 1887, Washington, D. C. Contents: One Hymenopteron; one flea-beetle (*Chætocnema denticulata*).

No. 6112.—Female; August 20, 1887, Washington, D. C. Contents: One Hymenopteron (*Myzine* 6-*cincta*).

No. 6134.—Young female; August 22, 1887, Washington, D. C. Contents: Remains of several locusts in pupa state (*Caloptenus* sp.); remains of one Hymenopteron (*Myzine* 6-*cincta*).

No. 6141.—Male; August 23, 1887, Washington, D. C. Contents: One Hymenopteron (*Myzine* 6-*cincta*).

No. 6151.—Male; August 24, 1887, Washington, D. C. Contents: One flea-beetle (*Chætocnema denticulata*).

No. 6153.—Male; August 24, 1887, Washington, D. C. Contents: One Hymenopteron; very small pieces of elytra of a Heteropteron.

No. 6161.—Female; August 24, 1887, Washington, D. C. Contents: One Hymenopteron (*Myzine* 6-*cincta*).

No. 6162.—Female; August 24, 1887, Washington, D. C. Contents: One lepidopterous larva (*Crambus* sp.).

No. 6163.—Female; August 24, 1887, Washington, D. C. Contents: Parts of one Hymenopteron (*Myzine* 6-*cincta*).

No. 6164.—Female; August 24, 1887, Washington, D. C. Contents: One Hymenopteron (*Tiphia* sp.).

No. 6204.—Young female; August 26, 1887, Washington, D. C. Contents: One Noctuid larva (*Lamphygma frugiperda*); One Perlid; one Psocus; four small ants (*Monomorium pharaonis*).

No. 6229.—Female; August 29, 1887, Washington, D. C. Contents: One Hymenopteron (*Tiphia* sp.); one flea-beetle (*Chætocnema denticulata*).

No. 6256.—Female; September 3, 1887, Washington, D. C. Contents: Very numerous specimens of flea-beetles (*Chætocnema denticulata*).

No. 6267.—Female; September 5, 1887, Washington, D. C. Contents: Remains of several small locusts, the species not recognizable.

HABITS OF THE INSECTS CONCERNED.

Order HYMENOPTERA.

HALICTUS sp.—Contained in Nos. 6025 and 6090.

There are numerous species of these small bees (fam. *Andrenidæ*) throughout the United States. They excavate cells in the soil of grassy fields, which cells are reached by a perpendicular burrow from six to twelve inches in depth. Each cell is filled by a lump of pollen the size and shape of a pea, upon which a single egg is deposited. The transformations take place within this cell. The mature insects feed upon pollen, are agents in fertilizing flowers, and therefore rather beneficial than harmful to man. As they are quite slow in their motions, especially in early morning or after a rain, they are readily captured.

TIPHIA sp., without much doubt *inornata* Say.—In ten stomachs, viz., Nos. 5526, 5532, 5545, 5662, 5693, 6026, 6091, 6093, 6164, and 6229 occur the remains of a *Tiphia*, family *Scoliidæ*. All the remains are in such a condition that the species can not be recognized with certainty, especially as they are separated on very trifling characters.

The life-history of *T. inornata* is recorded by me (6th Rep. Ins. Mo., 123). The black and rather hirsute wasp frequents flowers in open places. The females are enabled by their strong legs to dig into the soil, which they do in search of food for their offspring. This food consists of the larvæ of May-beetles (fam. Scarabæidæ), the so-called "white grubs," that of *Lachnosterna fusca* being particularly attacked. An egg laid upon or near the grub soon produces the wasp larva, which bodily devours its victim, leaving only the brown and horny head, which is almost invariably found fastened to the outside of a fine silken cocoon of a gold-brown color, and composed of many layers, made by the mature larva for transformation. *Tiphia* is therefore beneficial to man, and from the fact that it burrows in open places, such as lawns, gardens, and meadows, it is easily discovered by birds.

MYZINE SEXCINCTA Fab.—This brightly colored wasp, a member of the family *Scoliidæ*, occurred in the contents of many of the stomachs. The identification was made easy by the fact that the birds had chiefly taken the males which have a peculiar anal armature, consisting of three strong chitinous spines, too hard to be ground up or broken by the numerous pebbles almost always present in the stomachs. In no less than thirty cases, viz, Nos. 152, 5705, 5712, 5713, 5720, 5940, 5941, 5945, 5946, 5951, 5953, 5970, 5971, 5972, 5975, 5976, 5977, 5982, 6000, 6010, 6021, 6025, 6088, 6092, 6109, 6112, 6134, 6141, 6161, and 6163, either one, two, or several specimens were found.

This species of *Myzine* is very common throughout the Atlantic States and is usually seen flying low over sandy places. Its life-history has not been recorded, but we may safely infer for it a parasitic habit similar to that of *Tiphia*.

One reason why the Sparrows have been able to secure so many specimens of this wasp is to be found in a peculiar habit which the latter possesses. During rainy or dark days and also towards evening, many specimens congregate and sleep together upon stems of low herbaceous plants by securely fastening their mandibles into the stems, and in this condition they are easily secured.

ANTS.—In eight stomachs specimens of various species of ants were found.

No. 5532 contained 2 ants belonging to the genus *Solenopsis*, family *Myrmicidæ*. These small ants live in open places, forming nests of various sizes below the surface of the soil, in which they store food, usually the seeds of various kinds of grasses.

No. 5967 contained 2 females of the minute *Brachymyrmex heeri*, Forel, family *Formicidæ*. These ants are always found under stones and the females were probably caught while swarming and away from their nest.

Nos. 5975, 5976, and 6093 contained, together, thirteen specimens of the very small yellow ant (*Monomorium pharaonis* Linn.), family *Myrmicidæ*. These ants are very often troublesome in our houses, but are found as well in open places, in gardens, or fields. They are almost omnivorous, and eat all kinds of food found in the house and field, thus causing injury, though more frequently great annoyance, as it is very difficult to eradicate them if once domiciled.

Nos. 5971, 6004, and 6093 contained each the remains of one ant, too much broken and distorted to enable identification.

ICHNEUMONIDS.—The stomachs Nos. 5523 and 6087 contained each the broken legs of a hymenopterous insect apparently belonging to the family of *Ichneumonidæ*. The pieces are too small to enable one to even judge the genus. The *Ichneumonidæ* are well known to check the too rapid increase of plant-feeding insects.

HYLASPIS sp.—In No. 5532 was found one of these very peculiar and minute insects. It is a member of the family *Cynipidæ* and of the subfamily *Figitinæ*, and is closely allied to *Hylaspis americana* Ashm. This little Hymenopteron belongs to the parasitic *Cynipidæ*; it has never been raised from its host, but is very likely parasitic upon the larvæ of a Sawfly.

UNDETERMINED HYMENOPTERA.—In the stomachs of Nos. 123, 5665, 5712, 6007, 6110, and 6153 were found the remains of as many Hymenoptera. These remains consist of very small pieces of the legs or abdominal segments too much broken or ground up by the accompanying sharp gravel to permit identification.

Order COLEOPTERA.

DIPLOTAXIS sp.—In stomach No. 5636 were found small pieces of a beetle belonging to this genus, allied to the chafers and destructive to vegetation. The species of *Diplotaxis* are never, however, very numerous. Nothing is known of the life-history of the genus.

APHODIUS FIMETARIUS L.—Three specimens of this beetle were found in stomachs Nos. 123, 3360, and 5636. The species is common to Europe and North America, and both larva and perfect beetle feed in the excrement of various animals and may be thus considered beneficial. The female beetle also stores some of the dung in burrows and deposits an egg upon the same, the larva hatching therefrom developing on the food thus stored up.

APHODIUS GRANARIUS L.—Two specimens of this beetle were found in stomachs 216 and 1552. This common species also occurs in Europe and North America, and has a very similar life-history.

LACHNOSTERNA, evidently FUSCA.—In the stomachs of 5526, 5528, 5529, 5548, 5972, and 6018 were found pieces, usually joints of legs, of the above beetle, and in stomach 1593 occurred four large larvæ of this beetle. It is not possible from the character of the fragments to determine the species of this rather difficult genus, but as some of the Sparrows were killed in the grounds of the Department of Agriculture, where *fusca* abounded at the time, and the parts otherwise correspond, the probabilities are all in favor of their belonging to this common species.

These beetles, produced from the well-known White-grubs, are sometimes very injurious to our forest and shade trees, chiefly the oaks, and in certain years strip them entirely. The greater damage, however, is done by the larva to strawberry plants, lawns, and meadows. As the beetles retire during the day in the ground and are often but slightly covered with soil, they are easily captured.

LIOPUS sp.—The leg of one specimen of this Longicorn beetle was found in stomach 5712, not sufficient to determine the species. All the species live in the smaller dead branches and twigs of various forest trees, chiefly of hickory and oak They are not found in healthy and living wood.

COLASPIS BRUNNEA Fab.—Two specimens of this beetle were found in stomachs 195 and 5701. It is very abundant throughout the Atlantic region of the United States and extends as far southwest as Arizona. It occurs in various forms, some of which have been distinguished by name. The variety *flavida* is distinctly distinguished by its bright-yellow color and prominent elevated ridges between the deeply punctured sutures; *costipennis* is a southern form and has the ridges tinted with metallic green. It riddles the leaves of the wild and cultivated grape-vine, greedily devours the leaves of strawberries, and is found upon a multitude of wild plants such as the Potentilla. Its life-history is recorded in my Third Annual Report on the Insects of Missouri (1871, pp. 81–84) and Fourth do. (1872, p. 34). The larva feeds on strawberry roots, among which it can be found all through the fall, winter, and spring months; assumes the pupa state in June, and the beetles appear during that month and continue to issue in decreasing numbers till toward fall.

CHRYSOMELID.—Very young larvæ, not recognizable with certainty, were found in stomach 16.

CHÆTOCNEMA DENTICULATA Ill.—Specimens of these beetles (about 40) were found in 12 different stomachs, viz: 5536, 5537, 5662, 5701, 5713, 5924, 5940, 5946, 5970, 6110, 6151, and 6229.

This beetle is very common in grassy places, and is found upon all kinds of low, herbaceous plants. Its life-history is not known, but we are justified in assuming that the larva is either a leaf-miner or subsists upon roots. From the fact that the beetle is numerous and that its life-history has not yet been discovered, it can hardly be classed among noxious insects.

Wings and legs of a small chrysomelid were found in stomach 97, but not of sufficient size to determine the species.

SITONES sp.—Stomach 196 contained two mutilated specimens of a snout-beetle of the above genus too much broken to identify specifically This genus occurs all over the Northern Hemisphere, and the species are very difficult to classify if not perfectly fresh. Many of the North American species occur also in Europe, and are, perhaps, introduced. The life-history of several of these insects is known in Europe and the larvæ of some of them are said to make a cocoon like that made by Phytonomus; but the larvæ of most of them lead a subterranean life, and chiefly about the roots of clover and allied plants, sometimes doing more or less damage. The life-history of *Sitones flavescens* Allard is recorded by Mr. Webster in my last Annual Report (for 1886) as United States Entomologist (p. 580.) It occurs in autumn in the beetle state perforating the leaves of White Clover. The larva, of the usual Curculionid shape, is found among the roots of White Clover, and also bores into the crown, thus checking the growth of the plant or killing it outright. The pupa is found in a snug little cell amongst the roots.

SPHENOPHORUS PARVULUS.—Quite a number (at least 25) of the remains of this species were found in 19 different stomachs, viz: Nos. 2131, 2133, 5523, 5532, 5533, 5536, 5537, 5538, 5544, 5545, 5548, 5549, 5916, 5917, 5924, 5946, 5951, 6018, and 6089.

So far as known the species all burrow in the stems or roots of plants and, if numerous, do much damage to young corn. The life-history of *S. parvulus*, according to Mr. Lugger's observations and my own unpublished notes, is as follows: The mother beetle always selects the flower-stem of grasses and lays one or more eggs just above the second knot, which at this place is very soft and tender. The slit made for the reception of the egg looks as if made with a saw, and particles of the torn fiber usually adhere to the spot. The plant becomes dwarfed and usually dries. The larvæ feed on and transform to perfect beetles among the matted roots. The life-history of the larger species, as *S.* 13-*punctatus* and *S. sculptilis* (stomachs 202 and 97 contained 3 of this species) and *S. robustus*, are given in my reports (Ins. Mo., III, p. 60, *ff*, and Rep. U. S. Ent. for 1881–'82, p. 138, *ff*).

Unrecognizable pieces of several small snout-beetles were found in stomachs 201 and 1593. In the latter two heads and the tip of one elytron could be recognized; in the former only small pieces of elytra.

Order LEPIDOPTERA.

HYPHANTRIA CUNEA.—A single specimen of this species was found in each of the stomachs 2132 and 6015. The caterpillar, usually called the "Fall Web-worm," is one of the worst defoliators of our city shade trees, and is fully treated of in my last Annual Report (for 1886) and in Bulletin No. 10 of the division.

LAPHYGMA FRUGIPERDA.—Larvæ of this species were found in stomachs Nos. 6108 (which contained 3) and 6204 (which contained 1).

It is sometimes very abundant, and because of its resemblance to the genuine Army Worm was named the "Fall Army Worm" in my Third Report on the Insects of Missouri (1870). It is a very general feeder, and in some seasons becomes quite destructive. It is fully treated of in my Annual Report to the Department for 1881–'82.

CRAMBUS sp.—Stomach No. 6162 contained a larva of a species of *Crambus*, but not in a condition to determine the species.

Many species of this genus of moths are found throughout the United States, confining their attacks chiefly to the various kinds of wild and cultivated grasses and only occasionally proving injurious. The larvæ subsist upon the roots, and form in the soil galleries lined with silk. The full life-history of *C. vulgivagellus* is given in my Report as United States Entomologist for 1881–'82.

PYRALID.—Stomach No. 2132 contained a small female moth belonging to the family *Pyralidæ*, but the material was insufficient to permit determination even of the genus. The species of the family feed, as a rule, on vegetation, and some are injurious to cultivated crops.

JAWS OF CATERPILLARS.—The contents of Nos. 97, 2132, 6012, and 6089 show 11 jaws that belong to lepidopterous larvæ.

Suborder HETEROPTERA.

Very small pieces of the elytra, or thorax, of a species of the suborder Heteroptera were found in stomachs 289, 5720, and 6153. It is impossible to even identify the genus, but the pieces appear to be derived either from a *Podisus* or a *Euschistus*, both containing useful insects, which destroy numerous caterpillars by sucking them to death.

Suborder HOMOPTERA.

ERYTHRONEURA sp.—Stomachs Nos. 5954 and 5967 contained two specimens of a little Leaf-hopper belonging to the above genus.

Species of this genus are very numerous in our meadows, gardens, fields, and vineyards, and in the latter case do much damage.

Stomach No. 5544 contained one larva of a Leaf-hopper.

Order DIPTERA.

BLUE-BOTTLE FLY (*Musca cæsar* Linn.).—The pupæ of two, perhaps three, specimens of a Blow-fly occur in stomach No. 5542. They were evidently picked up with the partially-digested grain found in the droppings of a horse. The species, in rapidly removing decayed matter, renders good service to man and must be considered beneficial. Its larvæ or maggots feed in all kinds of offal and putrid matter, and when full-grown contract to coarctate pupæ which are usually found in the ground, but frequently in the manure itself.

HOUSE FLY (*Musca domestica*).—Stomach No. 5676 contained six house flies, and numerous more or less mature eggs of the same. The larvæ or maggots feed entirely upon decaying animal and vegetal matter.

Order ORTHOPTERA.

XIPHIDIUM sp.—A single young specimen of a species of the above genus of Meadow Grasshoppers was found in stomach No. 195.

The members of this genus of the *Locustidæ* are all distinguished by their small size and by a nearly straight ovipositor. Like their near relatives, the Katydids, they feed chiefly upon leaves of various kinds, but do not refuse succulent insects, as young caterpillars. The genus is common in our fields and gardens, where their shrill noise is frequently heard during the late summer or fall. They make longitudinal punctures in the pith of plants for the reception of the slender, elongate eggs.

GRYLLOTALPA sp.—One leg of the Mole-cricket was found in stomach 5973. Members of this genus are usually considered noxious, because they raise ridges in constructing their subterranean galleries, thus exposing the roots of grass and other plants. Yet their food consists very largely of other insects. The Mole-crickets are characterized by their enlarged fossorial fore feet, which recall those of the mole in shape, being stout, short, flattened, and armed with very hard and pointed projections.

CALOPTENUS sp.—Three undoubted pupæ of a small species of Caloptenus, probably of *femur-rubrum*, were found in stomachs Nos. 152 and 195. Also several unrecognizable remains of perhaps the same species in Nos. 6134 and 6267. This species, so closely allied to its Western relative, the destructive *C. spretus*, is more or less numerous every year, though it does but slight damage compared with its Western congener.

In stomach 152 a large specimen of *Caloptenus differentialis* was found. This is one of the largest of our common locusts. The First and Second Reports of the United States Entomological Commission are devoted to these destructive locusts.

TETTIX sp.—The remains of a single specimen of this small locust were found in stomach 195. This Sparrow had evidently acquired a taste for orthopterous insects, as three specimens of three different genera were eaten by it.

The species of this genus are all relatively small, and though common in many localities, are not known to occasion any great damage to our crops. Most of them are found along the edges of our forests and orchards between the dead leaves, and are well protected in such places by their dark brown or gray color, which resembles that of their surroundings.

Order NEUROPTERA.

PERLID.—Stomach No. 6204 contained the remains of a neuropterous insect which belongs to the family *Perlidæ*.

Members of this family spend their early stages in rivers under stones. The adults are frequently found resting on leaves in low damp places. Since the introduction of the electric light for illuminating our streets large numbers of these insects are attracted thereto.

PSOCUS sp.—Two specimens of *Psocus* were found in stomachs Nos. 6109 and 6204. *Psocus* species are numerous and found almost anywhere. They are sometimes very numerous in our yards and gardens, hiding between and under all kinds of rubbish, but are essentially innoxious. The species found can not be determined, owing to its poor condition. It is remarkable that both escaped the grinding action of the numerous pieces of gravel in the stomach. Some species feed upon dry vegetal substances and lichens, while a few are found only in houses, and feed upon dry animal matter.

ARACHNIDA.

SPIDERS.—A number of spiders, represented mostly by the legs, were found in five different stomachs, viz: Nos. 5532, 5533, 5537, 5545, and 5712. The remains of two species could be identified.

LYCOSA SCUTELLATA in No. 5533. This spider belongs to the wandering spiders, the members of which do not make a silken web to catch their food, but capture it by swiftness or by lying in ambush. It is quite abundant, frequenting fields, meadows, and gardens, and hides either under a stone, piece of wood, or any kind of rubbish, or dwells in holes made in the ground. As a general rule the female carries her egg-bag with her, and the newly-hatched spiders crowd upon the back of their mother until able to shift for themselves.

TARENTULA sp. occurred in No. 5532. This species has the same life history as the *Lycosa scutellata*, and occurs abundantly in similar places.

The habits of both are predaceous.

SUMMARY FROM THE FOREGOING STATEMENTS.

It thus appears that of the one hundred and two stomachs submitted, ninety-two contained, besides grain, seeds, and gravel, the remains of insects, *i. e.*, ninety-two out of a total of five hundred and twenty-two examined or seventeen and six-tenths per cent. Ten stomachs only of those examined by me contained no insect remains. As a general rule the amount of animal food was but small compared with the vegetal food and gravel.

All of the principal orders of Hexapoda are represented in the remains recognized, as also some Arachnids, as follows:

	Stomachs.		Stomachs.
Hymenoptera	59	Neuroptera	3
Lepidoptera	8	Orthoptera	9
Hemiptera	6	Coleoptera	53
Diptera	2	Arachnida	5

All the insects found are species frequenting open lawns, gardens, parks, and similar places, and almost always found upon or near the ground. This may be partly explained, however, by the fact that, as Mr. Barrows informs me, more than five-sixths of the Sparrows which contained insects were shot in the Department grounds. They are all common and abundant and easily caught by the Sparrows whilst seeking vegetal food in their usual haunts.

The presence of a large amount of gravel, composed chiefly of such hard material as quartzite, and the angular scales of hard-burned brick, obtained from sidewalks, has the tendency to destroy the softer parts of the insects. Various seeds, when partly digested, greatly resemble the chitinous parts of insects, and are apt to mislead when imbedded in the glutinous material derived from the ground-up portion of grains or when covered by small particles of straw, which are always present, and which in course of time become so transparent by constant grinding and digestive action that they look like the wings of small insects. Pieces of the discolored leaves of the Mullein (*Verbascum thapsus* Linn.), distinguishable by the stellate hairs upon their surface, are also readily mistaken for pieces of the elytra of some beetles and true bugs.

As may be gathered from the statement of their habits the insects taken from the Sparrows in question are represented most numerously by what may be called innoxious species, *i. e.*, species which do no particular harm to the agriculturist and, directly, but little good. Most of the Hymenoptera and the Arachnida, however, are indirectly beneficial, as are several of the Heteroptera. Even among the Coleoptera the innoxious outnumber the noxious species, and the good done by the birds in destroying the few Orthoptera and Lepidoptera is about counterbalanced by the number of species taken which are directly or indirectly beneficial to the farmer.

When it is considered that during the very year in which most of these birds were shot the shade trees of Washington were suffering from several insect defoliators, and that out of the four different species but two specimens of one of them, viz, *Hyphantria cunea*, were taken by the Sparrows, there can be no more eloquent comment on the bird's uselessness in protecting vegetation from insect injury. Not a single specimen of the Imported Elm-leaf Beetle, the Bag Worm, or the White-marked Tussock-moth was taken in any stage, and these facts correspond entirely with what I have stated in Bulletin No. 10, Entomological Division, published last year. In this connection it may be of interest, as Dr. Merriam has alluded to the subject at length in his report of last year, to repeat a letter, bearing on this particular point, which I wrote to Dr. Elliott Coues in 1878, and which, published, I believe, in one of the reports of the District Commissioners, has been lost sight of by naturalists. It shows the replacement of Paleacrita by Orgyia through the Sparrow's instrumentality, just as, four years earlier, Le Conte had shown, through similar agency, the replacement of Ennomos by Orgyia. It is as follows:

ANENT THE ENGLISH SPARROW.

MY DEAR DR. COUES: I notice by a recent article in one of our morning papers that Prof. T. M. Brewer, of Boston, Mass., has addressed a letter to our District Commissioners on the subject of the English Sparrows, in which he seems to animadvert pretty strongly on the position which you have taken in reference to this sparrow question. I do not fully know what recommendation with reference to this bird you have made to the Commissioners, nor do I wish to enter into the controversy that has been for some time going on between the bird's condemners and defenders; but there is an entomological phase of the question, which appears to be entirely overlooked by the latter class.

The English Sparrow was introduced ostensibly as a means of freeing the shade trees of some of our New England cities, and especially the elms, of that rather annoying pest, the well-known Canker-worm, and, more particularly, the species which I have designated as the Spring Canker-worm (*Paleacrita vernata*), to distinguish it from another species long confounded with it, but occurring later in the season. It is well known that this Spring Canker-worm was for many years a grievous nuisance, not only because of the injury it did to elms and other shade trees, but because it was continually spinning down upon persons who happened to be passing under infested trees. Its annoyances and injuries were, however, confined to some five or six weeks of the early part of the growing season, nothing being seen of it during summer and fall, as the worm descended into the ground to undergo its transformations. On account of the apterous nature of the female moth, the injuries of the species are also easily prevented, since tarred bandages or troughs of oil around the trunk of a tree will prevent her ascent as she issues from the ground in early spring. Such troughs were, indeed, at one time in such common use for this purpose in Boston, Cambridge, and Philadelphia that when, some years ago, the elm trees in Baltimore were found to be defoliated, the authorities at once ordered them to be similarly treated. The city fathers found out afterwards that they had paid dearly for their haste and want of special knowledge in that their trees were suffering, not from the Canker-worm, but from an Imported Elm-leaf Beetle (*Galeruca calmariensis*), which, having wings in both sexes, was not affected by the troughs. But, to come back to the Sparrows. They did, according to report, accomplish some good in clearing off the Canker-worm, though during late visits to Cambridge and other cities adorned with grand old elms, I found the tarred bandages still in use, thus indicating that our imported "Spatz" was not a perfect antidote for the evil. The interesting point, however, to which I wish to call your attention is that while the Canker-worm has been kept more or less in check by the activity of these saucy little birds, another insect, formerly scarcely noticed, has taken its place. Not only during the spring months, but throughout the growing season, the people are now annoyed by the hairy larva of the White-marked Tussock-moth (*Orgyia leucostigma*), there being several generations annually. This is a prettier creature to look at, but it has the same unpleasant faculty of dropping upon passers-by as had the plainer Canker-worm. The female is also like that of the Canker-worm, wingless, but the transformations of the species take place *above* ground, and she lays her eggs upon the outside of her cocoon, so that there is no such simple and available preventive in this case as in the other. Moreover, the Tussock-moth is much the more general feeder, and occurs on some trees which the Canker-worm never affected. As a consequence, this hairy worm has in many places become a greater scourge than was formerly the Canker-worm. It not only defoliates the trees, but covers and defaces them with its cocoons, which it also plasters upon fences, railings, and even houses.

I have been quite interested in observing the unprecedented multiplication of this hairy worm since the English Sparrow became so abundant, and we may well ask, in the expressive language of the time, "does protection protect?" There is nothing very surprising in these facts, because they are very much what naturalists expected. You can not encourage the undue multiplication of any one species of animal without causing a decrease of some other species, and the opposite of this proposition holds equally true. The hairy larva spoken of is distasteful to the Sparrow. The multiplication of this bird, in causing a decrease in the Canker-worms, presents a wider field for the Tussock-moth, and diminishes the competition in the struggle for existence which this last, like all creatures, is subject to. The same increase of the Sparrows necessitates a decrease of the native birds, some of which, doubtless, fed upon the Tussock-moth, and notwithstanding Professor Brewer's assertion to the contrary, I think the evidence shows such to have been the case.

Believe me, yours, very truly,

C. V. RILEY.

WASHINGTON, D. C.,
December 16, 1878.

It were premature to generalize from the study of the material so far examined, which I hope is but the beginning of a more extended study. For this purpose it is desirable that stomachs should be obtained from as many different parts of the country as possible, and especially during the spring of the year, when the bird probably takes the largest part of its insect food. Exact location and date are very essential, as this Sparrow is known to vary its habit according to season and circumstance. The 17.6 per cent. of the stomachs examined at the Department which contained insect food is probably larger than it otherwise would be, had it not been the custom, as Mr. Barrows informs me, of himself and Dr. Fisher, in shooting the birds, to choose rather those which were not feeding in the road. I do not know of any fact that more strongly indicates the relative uselessness in destroying injurious insects of the Sparrow as compared with many native birds which it drives away, than by a comparison of the insect food taken by a single Cuckoo (*Coccyzus americanus*). The stomach contents of a single female (Dr. Merriam's record No. 6333) shot in Washington, June 22, 1887, contained about 250 half-grown Web-worms (*Hyphantria cunea*) of the first brood, 1 large Cerambycid beetle (*Romaleum atomarium*) and its eggs, 1 large plant-bug (*Nezara hilaris*), and 1 Snail (*Helix alternata*), while in bulk the contents in this case rather exceeded the combined insect contents of the 522 Sparrow stomachs examined.

Considering how common the bird has been for centuries in Europe, and now is in most parts of the world, it is remarkable that so few thorough investigations into its insectivorous habits have been made, by which I mean a proper determination and analysis of the insects themselves from an agricultural standpoint.

The results of studies that have been made by others are somewhat contradictory, some examiners finding a large percentage of insect remains, others finding none; but in no instance that I am aware of has there been any attempt to analyze the nature of the insect food from the standpoint of beneficial or injurious to the farmer and fruit-grower.

SURVEY OF LATER WORK DONE IN EUROPE.

George Roberts, in *Hardwicke's Science Gossip*, 1883 (p. 217), mentions Mr. A. Willis, of Sandas, as having made a series of examinations of the stomachs of Sparrows in 1882. In 87 stomachs insects were found in only 8 cases, and he concludes that the bird is a superabundant and injurious species, and that it is the bounden duty of men to take all possible means to lessen its ever-increasing numbers.

From the "evidence submitted to the select committee on (British) wild birds protection," obtained in 1873, many interesting points about the habits of the House Sparrow can be learned. As far as actual dissections are concerned it seems that comparatively few were made, and some of the other statements are but vague. The following is a résumé of the dissections:

The statements of Mr. Champion Russell (p. 12) have been published in book form and will be mentioned later.

Prof. Alfred Newton, M. A., F. R. S., in a prophetic way, thinks that persons introducing the Sparrows into new places will soon find out their mistake.

Mr. C. O. Groome Napier thinks them the most objectionable English bird. He mentioned an exhibition of 100 stomachs of young Sparrows by Dr. Edwards Crisp before the British Association at Birmingham in 1865. Not 5 per cent. of them contained insect food.

Rev. J. Pemberton Bartlett opened the crops of the young, and found that at certain times they were full of insects, while at other times they contained only vegetable food, or a mixture of both.

Mr. George Swaysland killed many nestling Sparrows, and generally found grubs in their stomachs, or little beetles that run across the footpaths.

Mr. John Cordeaux opened the crops of 35 young Sparrows of various ages, and on an average found two parts of soft grain and one part of insects.

Mr. James Pertwee says the Sparrow is utterly bad. His gooseberry and currant bushes have their leaves eaten up, notwithstanding the numerous Sparrows in close vicinity.

An important European work to be mentioned in this connection is "The House Sparrow," by an ornithologist, J. H. Gurney, jr., including chapters by "a Friend of the Farmers," Col. C. Russell; and "The English Sparrow in America," by Dr. Elliott Coues. (London: William Wesley & Son, 1885.)

Mr. Gurney gives in a tabular form the results of many dissections made during a whole year, both of adult and juvenile specimens. He writes: "To give a summary of this table in a few words, it may be said that about 75 per cent. of an adult Sparrow's food during its life is corn (meaning wheat and small grains) of some kind. The remaining 25 per cent. may be divided as follows:

	Per cent.		Per cent.
Seeds of weeds	10	Caterpillars	2
Green peas	4	Insects which fly	1
Beetles	3	Other things	5

"In young Sparrows not more than 40 per cent. is corn, while about 40 per cent. consists of caterpillars, and 10 per cent. of small beetles. This is up to the age of sixteen days. Where green peas abound, as in market gardens, they form a much larger proportion of the Sparrow's food than the 4 per cent. here stated." He further states that young Sparrows in the nest are generally fed on caterpillars and other insects, particularly in August, yet a good many were opened in June and July without finding such food. He feels sure that, while very young, their diet is quite as much unripe grain and vegetable matter as caterpillars.

Col. C. Russell collected Sparrows from a wide extent of country to examine the contents of their stomachs. He found that the Sparrows destroyed even fewer insects than he had supposed. "The food in the old ones was almost all corn during the whole year; green peas were also found in them in summer; and in May and June, when corn is scarce, a few wild seeds, chiefly of grass. No insect has been found by me in a Sparrow between September and March. I have not often found one at any season (particularly between June and March) in a Sparrow old enough to feed itself, and have very seldom found any number of insects in one even when corn could scarcely be got." Speaking broadly, he continues: "It may be said that, unless very near houses and roads, Sparrows take no insects in the fields. Fifty old Sparrows, and young ones which could feed themselves, were killed one summer about my buildings and garden, with food in their crops. This food, carefully examined (as in all cases, with a lens), was found to be corn, milky, green, and ripe, and sometimes green peas from my garden; only two small insects were found in the whole number. The food in them has been much the same every year. On the whole, the deduction from the food test during fifteen years seems to be that the Sparrows are useless, and that the insects which would be given to their young by them if they were allowed to live in numbers about my premises would be so much food taken, when they most want it, from better birds which live entirely, or nearly so, on insects, and thus keep them, especially caterpillars, down so effectively in the absence of Sparrows that, when a chance pair of these come and build, there are few of their favorite sorts for them."

Dr. Schleh, of Herford, Germany, in his "Nutzen und Schaden des Sperlings im Houshalte der Natur," as quoted by E. Ingersoll in *Science* (Vol. VII, p. 80, January 22, 1886), says that young Sparrows, while in the nest and for a week after having left it, subsist entirely on insects, grubs, etc. Two weeks after leaving the nest their food still consists of 43 per cent. of animal food; a week later of 31 per cent., and after that age of only 19 per cent. As soon as independent they prefer seeds." He is one of the few authors who believe the Sparrow to be beneficial, but, so far as I can learn, he assumes all insects to be noxious.

REVIEW OF WORK DONE IN NORTH AMERICA.

Peter Henderson, of Bergen City, N. J., in his book on "Practical Floriculture," says (p. 173) that in the summer of 1866 acres of young rose bushes were attacked by slugs (*Selandria*) and *Aphis*, but that in 1868 a whole army of thousands of English Sparrows acted as volunteer exterminators. One Sparrow was shot, and his crop contained seeds, *Selandria*, and *Aphis* in great abundance. No one has a higher appreciation of Mr. Henderson's practical knowledge of gardening and the nursery business generally, but knowing how often the rose slug and the rose Aphis disappear suddenly in summer time from natural causes, my old-time friend will pardon a doubt as to whether the Sparrow deserved the full credit which he gives it.

My late friend, Dr. John L. LeConte, in 1874 gave an interesting account (see abstract Proc. Am. Asso. Adv., vol. 23, p. 44) of the replacement of *Ennomos subsignaria*, a span-worm that had been very injurious to shade trees in Philadelphia and other cities, by *Orgyia leucostigma*, through the Sparrows eating the former and avoiding the latter, just as in the letter already quoted I subsequently showed to be the case with *Paleacrita* and *Orgyia* through the same agency.

Dr. John Dixwell dissected the stomachs of 39 Sparrows shot at the height of the canker-worm season in Boston, with the result (*Boston Daily Advertiser*, March 7, 1878) that no insects were found.

Dr. H. A. Hagen, in an article published in the *American Agriculturist* for May, 1878, fully discusses the question of the bird's usefulness, quoting various old European writers *pro* and *con*, as T. F. Bock in 1784, F. M. Bechstein in 1795, as well as later writers like C. W. L. Gloger. Dr. Hagen argues strongly in favor of the bird from a utilitarian standpoint, but brings forth no new positive evidence of an original character.

Dr. C. J. Maynard, in the *Scientific Farmer* for March, 1879, records the results of fifty-six dissections made from September 17 to October 10, all of the birds having been shot in the city of Boston, and including both young and old. He gives a very full statement, together with a description with illustrations of the structure of the stomach of the Sparrow, and it is somewhat surprising that he found no insect remains in these fifty-six stomachs.

In *Forest and Stream* (Vol. XII, p. 424, July 3, 1879) is quoted a statement of the Elizabeth (N. J.) Journal, to the effect that the English Sparrows had been observed eating immense numbers of winged ants. It mentions another observation where a Sparrow had eaten a maimed hornet.

The same journal (Vol. XXIX, p. 164, September 22, 1887) states that web caterpillars (doubtless Hyphantria is meant), having become exceedingly numerous upon a Virginia Creeper in Sing Sing, N. Y., entirely denuded it and so exposed the roosts of the Sparrows that the birds had to give way and move their quarters.

In the *American Naturalist* (Vol. XV, pp. 392–393, 1881), Prof. S. A. Forbes, of Illinois, who has done the best work of any one in America on the relation of birds to insects, dissected twenty-five Sparrows killed during the month of September, in 1879 and 1880. He found the fragments of grain picked up on the streets, the seeds of a few of the commonest grasses, and traces of three locusts, the latter perhaps six per cent. of the food consumed. At the same time thirty per cent. of the food of the Robin, twenty per cent. of that of the Catbird, and ninety per cent. of that of the Bluebird consisted of insects.

Dr. B. H. Warren, of West Chester, Pa., in an essay read before the West Chester Mic. Soc., September 4, 1879, stated that of the autopsies of seventy-five Sparrows, made in 1878, seventy-three revealed solely grain and vegetable material. In the other two cases, the stomachs, which were distended with wheat, contained each a Coleopterous insect not specifically identified.

To disprove the claim that sparrows are graminivorous only in winter, when in order to sustain existence they are obliged to live on a grain diet, he examined during the months of March, April, May, and June fifty specimens, of which number forty-seven showed cereal and vegetable food, one contained a single (unidentified) Coleopterous insect in conjunction with an abundance of wheat, and the two remaining birds were void of any nutritious matter.

He also examined the stomachs of one hundred and fourteen English Sparrows, between March 1, 1879, and June 12, 1882. Only five of these stomachs contained any traces of insects. These were:

No. 12, March 3, 1879.—One beetle (undetermined). No. 58, May 23, 1880 (young).—Apterous insects (unidentified). No. 74, September 13, 1880 (male adult).—One potato-beetle (probably *Doryphora 10-lineata*). No. 75, September 3, 1880 (male adult).—Diptera (unidentified). No. 112, June 12, 1882 (female adult).—Two diptera and three aptera (unidentified).

Mr. Charles Dury has given in the Cincinnati *Commercial Gazette*, of May 6, 1883, the results of the dissection of over fifty English Sparrows. One of the sparrows was killed April 28 in a cherry tree covered with insects; but the distended crop contained nothing but grain, and one infinitesimal portion of the skin of a Hemipterous insect. Five sparrows were killed by him March 25 in the Zoological Garden; they were found filled with grain and seed, and three contained minute portions of beetles. In all the others no insect remains were found.

Mr. Barrows has collected a number of records, of which the following have been submitted to me, as among the more reliable:

Mr. James Fletcher, Ottawa, Canada, examined about a dozen Sparrows, which were shot in the early part of March, before the beginning of spring weather; none of the specimens contained any food other than bread or crushed grain from horse droppings.

Dr. W. S. Strode, of Bernadotte, Fulton County, Ill., made a number of dissections during the months of August and September, 1887, the report of which has been sent in to Dr. Merriam. He found no insects. During the first half of August the food was made up almost entirely of wheat and rye, and occasionally a few weed seeds. In September grapes were the principal food; the Sparrows would insert their bills, suck out the juice and pulp, but discard the seeds.

One other instance, much more recent, of the study of the food-habits of this bird should be mentioned before I conclude. It is an examination of a large number of stomachs by Mr. W. Brodie, the results of which have been presented before the biological section of the Canadian Institute and published in separate sheet. Mr. Brodie found that out of forty-three stomachs taken from August 20 to September 13, twenty-seven contained remains of locusts, or so-called grasshoppers, and out of three hundred and seven stomachs in all collected from May 7, 1881, to September 20, 1887, one hundred and thirty-two contained insect remains, including for the most part locusts (fifty-eight cases, not including birds which he fed with them), among which the *Œdipoda carolina* and *Caloptenus femur-rubrum* were recognized. In four cases Coleoptera were found and referred to Carabidæ, and in seven others a

Geometrid larva not identified; in two others the pupa of a Dipteron and small Lepidopterous larvæ, and in two others spiders—none of the species identified.

My assistant, Mr. Otto Lugger, reports to me that during the month of May, 1883, in Baltimore, Md., he dissected twelve English Sparrows. They were all killed in the yard of his house, which is situated in the outskirts of the city, and at that time was in the close vicinity of many trees. The climbing roses in this yard, as well as in those of the neighboring gardens, were badly infested by one of the rose-slugs (*Selandria*), and the sparrows, which were in the habit of resting upon the bars supporting the roses, were killed to ascertain whether or not they had eaten any of the slugs. The dissections revealed no trace of these, and only the legs of two flies (*Muscidæ*) were discovered. The great bulk of food consisted of grain and flower seeds of various kinds, taken from the very same yard. The only large pea eaten by the birds contained, snugly inclosed, a pea-weevil (*Bruchus pisi*).

The above constitute all the more reliable dissections that have been made; but Dr. Merriam has gathered together and submitted to me a very large number (five hundred and ninety-one) of reports not based on dissections, and made by persons who in some instances had seen the Sparrows feeding upon insects; in others not. It is exceedingly difficult to analyze these reports, which will be duly published by him.

Of these five hundred and ninety-one reports two hundred and sixty-seven are mainly favorable to the Sparrow, in the sense that all insects eaten are considered injurious; one hundred and thirty eight are unfavorable; one hundred and eight are indeterminate, and seventy-eight correspondents believe that insects are only eaten by the bird when forced to do so.

The following summary, prepared by Mr. Barrows, will convey a very good idea of the character of these reports. Only the more definite reports have been selected, and mainly those in which some attempt had been made to identify the insects, including also a certain number of dissections:

Kills canker-worms in large numbers.—A. C. Sheldon, New Haven, Conn.; R. D. Camp, New Haven, Conn.; W. B. Barrows, Middletown, Conn.

Does not kill cabbage-worms.—W. Holmead, Mount Pleasant, D. C.

Eats moths of fall web-worms.—J. Halley, Washington, D. C.

Feeds upon cabbage-worms, flies, ants, etc.—W. A. Porter, Alpharetta, Ga.

As a destroyer of caterpillars, it is a failure.—Hon. W. A. Harris, Atlanta, Ga.

Prefers Crickets and Grasshoppers.—Th. B. Lumpkin, Buena Vista, Ga.

Never touches Cabbage-worm or Cotton-worm.—J. H. Barnes, Griffin, Ga.

Probably eats many Bot-flies.—Dr. D. Berry, Carmi, Ill.

Feeds its young with insects for seven or eight days after hatching.—Jabez Webster, Centralia, Ill.

Eats an occasional Tobacco-worm and Grasshopper.—G. B. Holmes, Fernwood, Ill.

Seen to catch Army-worms by the thousand.—Charles Becker, Freeburgh, Ill.

Have not noticed it eating Army-worms or other injurious insects.—A. Gierschner, New Athens, Ill.

Carefully watched, where insects abound, but none eaten.—D. W. Brattin, Brazil, Ind.

Takes Cabbage-worms for its young.—Edw. Yenowine, Edwardsville, Ind.

Prefers moths to caterpillars.—Dr. W. Weber, Evansville, Ind.

Eats Potato-bug larvæ and Cabbage-worms to a small extent.—A. B. Ghere, Frankfort, Ind.

Eats Tent-caterpillars, Fall Web-worm larvæ, and Cabbage-worms.—W. H. Ragan, Greencastle, Ind.

Feeds upon Cabbage-worms.—George B. Byrum, Laconia, Ind.

Eats *Cicada septendecim* and grasshoppers (*Melanopus femur-rubrum*).—F. M. Webster, La Fayette, Ind.

Eats caterpillars.—James N. Payton and John B. Mitchell, New Albany, Ind.

Cabbage-worms destroyed, but not more than by other birds.—W. R. Stratford, Vevay, Ind.

Eats Leaf-rollers and beetles.—Dr. L. Millar, Belleview, Iowa.

Destroys large numbers of Codling-worms, larvæ of beetles and *Aphidæ*.—Howard Kingsbury, Burlington, Iowa.

Attacks a wounded grasshopper.—D. Y. Overton, Burlington, Iowa.

Destroys immense numbers of insects and worms of all kinds.—Max Kruskopf, Marshalltown, Iowa.

Eats the Bot-fly, Horse-fly, Melon-bugs, Grasshoppers, etc.—W. E. Dingman, Newton, Iowa.

Eats Canker-worms.—J. S. McCartney, Garnett, Kans.

Destroys Codling-moths and millers.—M. A. Page, Garnett, Kans

Not seen to eat insects; does not touch the Maple-worm.—B. F. Smith, Lawrence, Kans.

Does not molest Maple-worms, even about its nest.—Dr. Charles P. Blachly, Manhattan, Kans.

Constantly on the ground in quest of insects.—Dr. W. S. Newlon, Oswego, Kans.

Eats Chinch-bugs, Army-worms, Grasshoppers, etc.—H. Heemey, Severance, Kans.

Trees filled with worms which the English Sparrows did not touch.—J. B. Stockton, Toronto, Kans.

Eats larvæ of every description, except those of Potato-beetle.—J. A. Terrell, Bloomfield, Ky.

Twenty-seven stomachs examined without finding bug or worm.—Postmaster, Bowling Green, Ky.

Feeds young on moths of hairy caterpillar.—Thomas S. Kennedy, Crescent Hill, Ky.

Eats Cabbage-worms especially.—E. W. Weathers, Elkton, Ky.

Catches Tobacco-moth and other moths and butterflies.—D. L. Adair, Hawesville, Ky.

The white caterpillar on shade trees has been nearly exterminated —J. B. Nall, Louisville, Ky.

Eats army-worms, Cut-worms, and caterpillars on shade trees in large numbers.—A. P. Farnsley, Louisville, Ky.

Have dissected them often, but found no insects.—W. B. Berthoud, Barataria, La.

Does not eat the Cotton-worm.—W. C. Percy, jr., Black Hawk, La.

"Insects remain undisturbed in its very roosting trees."—L. E. Bentley, Donaldsonville, La.

Eats *Orgyia* caterpillars and many other insects.—George H. Berry, North Livermore, Me.

Does not eat *Orgyia*.—Everett Smith, Portland, Me.

Fifteen birds dissected, but only two contained animal food, and this was fragments of spiders.—N. C. Brown, Portland, Me.

Eats white-ants, flies, Cicadæ.—Otto Lugger, Baltimore, Md.

Orgyia and Canker-worms increase.—W. Brewster, Cambridge, Mass.

Canker-worms decrease, but not *Orgyia*. The Sparrow can not eat hairy caterpillars.—Dr. H. A. Hagen, Cambridge, Mass.

Canker-worms and spiders eaten in large numbers.—J. W. Pearson, Newton, Mass.

Eats limited numbers of insects all the year.—Elisha Slade, Somerset, Mass.

Eats hundreds of Canker-worms.—Charles H. Andros, Taunton, Mass.

Never seen to eat insects.—John C. Cahoon, Taunton, Mass.

Marked benefit by eating Currant and Cabbage-worms.—F. O. Hellier, Grass Lake, Mich.

Have yet to see a single instance in which it is beneficial.—O. C. Smith, North Adams, Mich.

No bird here eats so few insects.—Norman A. Wood, Saline, Mich.

Feeds on Grasshoppers after breeding season is over; also eats Potato-bugs, etc.—George Stolworthy, Franklin Falls, N. H.

Does not eat *Orgyia* caterpillars.—David C. Voorhees, Blawenburgh, N. J.

Does not eat Vaporer moth (*Orgyia*) to any extent, if at all.—Marcus S. Crane, Caldwell, N. J.

Seven Sparrows dissected where Elm-leaf beetles were abundant contained no insects.—Marcus S. Crane, Caldwell, N. J.

Never touches insects; sixty dissections and not a trace of an insect.—H. B. Bailey, Orange, N. J.

Moths have their wings pulled off and are then let go.—Weldon F. Fosdick, Hackensack, N. J.

Many dissections, but not an insect. Canker-worm very prevalent, but not eaten.—Lloyd McKim, Garrison, Orange, N. J.

Eats Winged ants (*Termes flavipes?*).—W. J. Kenyon, Brooklyn, N. Y.

Eats Measuring worms (*Ennomos subsignaria*); not seen to take *Orgyia* moths or larvæ.—Hon. Nicolas Pike, Brooklyn, N. Y.

Eats Bot-flies, caterpillars, White Cabbage butterfly, *Cicindela.*—Prof. Chas. Linden, Buffalo, N. Y.

Once found a Currant-worm in crop of Sparrow.—Wm. M. McLachlan, Clyde, N. Y.

Army-worms devoured in immense numbers.—J. A. Perry, New York, N. Y.

Eats Currant-worms, ants, etc., but no hairy worms.—A. Church, New York, N. Y.

Eats Army-worm.—Henry M. Burtis, Port Washington, N. Y.

"Occasionally it catches a spider, fly, or some other insect."—Dr. Alfred Hasbrouck, Poughkeepsie, N. Y.

Does not eat hairy caterpillars; *Orgyia* has increased.—H. Roy Gilbert, Rochester, N. Y.

Hundreds seen eating grasshoppers in a dry season.—Thomas Birt, Utica, N. Y.

Plant-lice eaten sometimes.—Prof. E. W. Claypole, Akron, Ohio.

Will not touch tree insects, however abundant.—W. Hubbell Fisher, Cincinnati, Ohio.

Ephemeræ eaten; elm-tree worms disregarded.—Dr. E. Sterling, Cleveland, Ohio.

Many dissections in autumn, but no sign of insects; Web-worms not touched, although very abundant.—W. B. Alwood, Columbus, Ohio.

Have watched closely, but have never seen one eat an insect.—E. W. Turner, Newton Falls, Ohio.

Eats Grasshoppers and seventeen-year Cicadæ.—R. H. Warder, North Bend, Ohio.

The Currant-worm has appeared since the Sparrow came.—S. Gray, Norwalk, Ohio.

Close observation shows no insects in its stomach.—Thos. Shroyer, Preston, Ohio.

Scale insects are eaten largely.—W. B. Hall, Wakeman, Ohio.

Orgyia abounds; Sparrow eats measuring worms and diurnal lepidoptera.—Thos. Meehan, Germantown, Pa.

Destroys millions of insect eggs and larvæ.—C. A. Green, Harrisburg, Pa.

Did not eat *Galeruca*, Web-worm, *Epilachna*, or *Lecanium*, which were abundant.—Dr. S. S. Rathvon, Lancaster, Pa.

Eats moths singed by gas, but fails to touch living Currant-worms close by.—Dr. R. L. Walker, Mansfield, Pa.

Numerous stomachs examined, but very few insects found.—Dr. H. D. Moore, New Lexington, Pa.

Out of 50 dissections in March, April, May and June, no insects but one beetle.—Dr. B. H. Warren, West Chester, Pa.

Eats young grasshoppers after oats are harvested.—B. F. Maxson, Westerly, R. I.

Does not disturb the Cotton-worms.—W. J. Hinson, James Island, S. C.

Eats maggots from dead animals.—W. T. Nixon, Lawrenceburgh, Tenn.

Does not destroy the Codling-moth.—James G. Kenney, Provo City, Utah.

Eats larvæ of Bot-flies.—Dr. Hiram A. Cutting, Lunenburgh, Vt.

Feeding in large flocks on Grasshoppers.—George M. Neese, New Market, Va.

Does not eat caterpillars on the elm.—Col. Randolph Harrison, Richmond, Va.

Destroys Cabbage-worms and Tent-caterpillers.—Dr. J. R. Mathers, Buckhannon W. Va.

Noticed a few alight on webs of Tent-caterpillars.—John H. Strider, Halltown, W. Va.

Very destructive to Cabbage-worms (*Pieris rapæ*).—J. H. Shank, Hickory, W. Va.

Does not eat caterpillars on grape-vines and pear trees close to nest.—G. W. Knapp, Leon, W. Va.

Eats Grasshoppers and Katydids.—Z. L. Welman, Stoughton, Wis.

This list includes quite a number of injurious species, together with a fair proportion of beneficial and innoxious ones. In the majority of the cases, however, the observations are based on seeing the bird capture the insect, and this kind of information is always less reliable than that obtained from dissections. From a long experience in collecting entomological data through circularization I have learned how unreliable the reports are, except when the reporter has some special and expert knowledge.

Among the more injurious insects captured are instances of Bag worms, Rose bugs, Tobacco-worms, Plum Curculio, "Codling-worm," Scale insects, Aphididæ, Chinch-bugs, and Cabbage-worms. Now these are in almost all cases isolated instances, and granting the observations to be correct, they do no alter the fact, that where any of these insects have been common within, or in the neighborhood of, a city where the Sparrows are abundant, the birds have in no instance affected the power of the insects for harm. Hence such reports, unless they take into consideration all the facts bearing upon the subject, are misleading.

Four cases are mentioned where the larvæ of Orgyia and one where the larvæ of Hyphantria have been eaten. Such cases, even if isolated, are extremely interesting; but for the present must be disposed of in the same way as those just instanced. The cases where the bird is reported as taking Locusts (Acrididæ), Grasshoppers (Locustidæ), and the Army-worm and Cut-worms (Noctuid larvæ) are sufficiently numerous to show that in these directions the Sparrow in the country, and under conditions of scarcity of other kinds of food, might prove of considerable benefit. The same may be said of the Canker-worms, and some other smooth Geometrid larvæ, especially *Ennomos subsignaria*, which affect trees and shrubs.

One other instance may be mentioned where the Sparrow is more or less useful, because it is in a direction scarcely looked for. This is in the feeding on bot larvæ. There is sufficient evidence that in cities the bird enjoys these larvæ, which it picks up from the droppings of horses. The beneficial bearing of this fact is somewhat neutralized, however, by the other fact that on the paved streets of our cities the *Gastrophilus* larvæ rarely, if ever, succeed in transforming; but perish from inability to enter the ground.

We are thus justified in concluding that the bird will exceptionally feed upon almost any insect; but I am strongly inclined to believe that the deduction made from my own examinations will hold very generally true, and that, in cases where injurious insects have been fed upon, it is not by virtue of any insectivorous habit or specific preference, but by mere accident. Except in the cases of Locusts and meadow grasshoppers, some field insects, the Canker-worm, and some few other smooth worms which affect trees, there is no evidence that the bird, notwithstanding its great numbers, has been instrumental in checking any of our insect pests.

Two other circumstances for which there is sufficient evidence are worthy of mention as bearing on the question under discussion, viz, (1) the bird's tendency to take insects already damaged or dead; and (2) the fact that the old birds take insects for their young rather than for themselves.

Finally, the examinations, taken as a whole, show how thoroughly graminivorous or vegetarian the Sparrow is, as a rule, and I need not in this connection add, from my own experience or from that of others, to the verdict of "destructive" which Dr. Merriam has already so well established in his last report as Ornithologist to the Department of Agriculture.

In Australia and New Zealand the farmers have been forced to poison the birds by wholesale. Their most successful method is that of placing poisoned wheat in a bag with chaff, and allowing it to leak over the tail of the cart along the road. The Sparrows are destroyed by the bushel, and one paper (*Garden and Field*, of Adelaide, Nov., 1887, vol. 13, p. 76) published the following effusion, by the "Adelaide Poet Laureate," with which I would close this report:

What means this sadly plaintive wail,
  Ye men of spades and ploughs and harrows?
Why are your faces wan and pale?
  It is the everlasting sparrows.

We may demolish other pests
  That devastate the farm and garden;
But spoiled by these voracious guests,
  Our prospects are not worth a farden.

We can't defeat a foe like this
  With gunshot or with bows and arrows;
We must resort to artifice
  To cope with enemies like sparrows.

Our level best we all have tried
  With scarecrows, nets, and cunning cages,
Our utmost efforts they deride,
  And spoil our fruit in all its stages.

Lift up your heads, your hearts lift up,
  Resume your spades, your ploughs and harrows,
And while you drain the genial cup,
  I'll tell you how to lick the sparrows.

No more your wasted fruits bewail,
  Your crops destroyed of peas and marrows,
A cure there is that can not fail
  To rid you of the hateful sparrows;

The remedy is at your feet,
  Slay them and wheel them out in barrows,
Poisoned by Faulding's Phœnix wheat,
  The one great antidote to sparrows.

TABLES OF FOOD AS SHOWN BY DISSECTION.

We conclude the discussion of the insect food of the Sparrow with tables giving the entire contents, so far as it was possible to determine them, of 522 stomachs dissected at the Department of Agriculture, and of 114 stomachs dissected at West Chester, Pa.

Of the number dissected at the Department of Agriculture, 338 were from birds killed in Washington, and many of these were examined within an hour or two after death. The remaining 184 stomachs were sent to Washington in alcohol. In all cases they were carefully examined in the Ornithological Division first, by Dr. A. K. Fisher, who identified and recorded their general contents. Subsequently those which contained any traces of insect remains, or in which the presence of such material was suspected (102 in all), were referred to the Entomological Division for further examination, and 92 were found to contain insect remains in greater or less abundance. From Professor Riley's report on this subject the data have been obtained for the insect columns in the following tables, which were prepared by Dr. A. K. Fisher, assistant ornithologist.

It is only necessary to say, in explanation of these tables, that a cross in any column indicates that the kind of food specified at the head of that column was found in the specimen against which the cross stands. No attempt was made to estimate the percentages of different kinds of food in the individual stomachs, except in the case of the insect food, to which reference has been made already.

TABLES OF FOOD AS SHOWN BY DISSECTION.

Contents of stomachs of English Sparrows (*Passer domesticus*).

[Examined at the Department of Agriculture.]

Catalogue number.	Sex and age.	Date of capture.	Locality.	Cereals.			Fruit seed.	Grass seed.	Weed seed.	Undetermined vegetable matter.	Bread, rice, etc.	Insect food.			
				Wheat.	Oats.	Corn (maize.)						Beneficial species.	Noxious species.	Indifferent species.	Kind of insect.
4061	♂ im.	1886. Sept. 21	East Hartford, Conn.	...	...	×	...	...	...	×	...	...	...	...	
4082	♀	Oct. 26	do	...	...	×	...	...	...	×	...	...	...	...	
4083	♀	do	do	...	...	×	...	...	...	×	...	...	...	...	
4084	♂	do	do	...	...	×	...	...	...	×	...	...	...	...	
4085	♀	do	do	...	...	×	...	×	...	×	...	...	...	...	
4086	♀	do	do	...	...	...	...	×	...	×	...	...	...	...	
4087	♀	Oct. 29	do	...	...	×	...	...	...	×	...	...	...	...	
4088	♀	do	do	...	...	...	...	...	...	×	...	...	...	...	
4089	♀	do	do	...	...	×	...	...	...	×	...	...	...	...	
4090	♀	do	do	...	...	...	...	...	...	×	...	...	...	...	
4092	♀	Nov. 5	do	...	...	...	...	×	...	×	...	...	...	...	
4093	♂	do	do	...	...	×	...	×	...	×	...	...	...	...	
4094	♀	do	do	...	...	...	...	×	...	×	...	...	...	...	
4099	♂	Nov. 22	do	...	...	...	...	×	...	×	...	...	...	...	
4100	♀	do	do	...	×	×	...	...	...	×	...	...	...	...	
4101	♀	do	do	...	×	...	...	...	...	×	...	...	...	...	
4102	♀	do	do	...	×	...	...	×	...	×	...	...	...	...	
4103	♂	do	do	...	×	...	...	...	...	×	...	...	...	...	
4104	♀	do	do	...	...	×	...	×	...	×	...	...	...	...	
4105	♂	do	do	...	...	×	...	×	...	×	...	...	...	...	
4106	♀	do	do	...	...	...	...	...	...	×	...	...	...	...	
4107	♂	do	do	...	...	×	...	...	...	×	...	...	...	...	
4110	♂	Dec. 2	do	...	...	...	...	×	...	×	...	...	...	...	
4111	♂	do	do	...	...	...	...	×	...	×	...	...	...	...	
4112	♀	do	do	...	...	...	...	×	...	×	...	...	...	...	
4113	♀	do	do	...	×	...	...	×	...	×	...	...	...	...	
4114	♂	do	do	...	...	...	...	×	...	×	...	...	...	...	
4115	♂	Dec. 6	do	...	×	...	...	...	...	×	...	...	...	...	
2149	♀ ad.	July 31	Gainesville, Va.	...	×	...	...	...	...	...	...	...	...	...	
2327	♀	May 5	Milwaukee, Wis	...	×	...	...	...	...	...	...	...	...	...	
2329	♀	May 7	do	...	×	...	...	...	...	...	...	...	...	...	
2397	♂	May 4	Savannah, Ga.	...	...	...	...	...	...	×	...	...	...	...	
2699	♂	Sept. 12	Alfred Centre, N. Y.	...	×	...	...	...	...	×	...	...	...	...	
3075	♂	June 27	West Goshen, Pa.	...	×	...	...	...	...	×	...	...	...	...	
3812	♀ juv.	Aug. 2	Philadelphia, Pa.	...	...	...	...	...	...	×	...	...	...	...	
4589	♂ ad.	1887. Apr. 12	Washington, D. C.	...	...	...	...	...	...	×	...	...	...	...	
1468	♂	1885. Nov. 1	Cleveland, Ohio.	...	×	...	...	...	...	...	...	...	...	...	
15	♀ juv.	July 7	Sing Sing, N. Y.	...	×	...	...	...	...	×	...	...	...	...	
40	♂ ad.	July 11	do	...	×	...	...	...	...	...	...	...	...	...	
45	♀ im.	July 14	do	...	×	...	...	...	...	...	...	...	...	...	
46	♂ im.	do	do	...	...	...	...	...	...	×	...	...	...	...	
47	♀ im.	do	do	...	...	...	...	...	...	×	...	...	...	...	
49	♀ im.	do	do	...	...	...	...	...	...	×	...	...	...	...	
98	♀ ad.	July 25	do	×	...	...	...	...	...	...	...	...	...	...	
103	im.	July 27	do	...	×	...	...	...	...	×	...	...	...	...	
104	♀ im.	do	do	...	×	...	...	×	...	...	...	...	...	...	
105	♂ im.	do	do	...	×	×	...	...	...	×	...	...	...	...	
106	♂ im.	do	do	...	...	×	...	...	...	×	...	...	...	...	
107	♂ im.	do	do	...	×	...	...	×	...	×	...	...	...	...	
124	im.	July 28	do	...	...	×	...	...	...	×	...	...	...	...	
152	♀ im.	Aug. 4	do	...	×	...	...	...	...	...	...	×	×	...	3 wasps; 2 small grasshoppers.
194	♂ im.	Aug. 10	do	...	×	...	...	...	...	...	...	...	...	...	
195	♂ ad.	do	do	...	...	...	...	...	...	×	...	...	×	...	3 young grasshoppers; 1 leaf flea beetle.

Contents of stomachs of English Sparrows (*Passer domesticus*)—Continued.

Catalogue number.	Sex and age.	Date of capture.	Locality.	Cereals.			Fruit seed.	Grass seed.	Weed seed.	Undetermined vegetable matter.	Bread, rice, etc.	Insect food.			
				Wheat.	Oats.	Corn (maize).						Beneficial species.	Noxious species.	Indifferent species.	Kind of insect.
196	♂ im.	1885. Aug. 10	Sing Sing, N. Y.		×								×		2 snout-beetles.
197	♀ ad.	do	do							×					
198	♀ ad.	do	do							×					
199	♀ ad.	do	do		×										
200	♀ ad.	do	do							×					
217	♂ im.	Aug. 11	do		×										
245	♂ im.	Aug. 15	do		×	×									
355	♀ im.	Aug. 29	do			×									
496	♂ im.	Sept. 3	do	×	×					×					
497	♀ im.	do	do	rye	×			×							
498	♂ im.	do	do	rye	×			×							
499	♂ im.	do	do		×										
500	♂ im.	do	do	×	×										
501	♀ ad.	do	do		×					×					
502	♂	do	do	×	×					×					
690	♀ ad.	Sept. 12	do	×	×										
722	♂ ad	Sept. 17	do							×					
723	♂ ad.	do	do	×											
1105	♂	Oct. 16	do		×					×					
1106	♀	do	do							×					
6274	♀	1887. Sept. 14	Washington, D. C.					×		×					
6275	♂	do	do							×					
16	♂ juv.	1885. July 7	Sing Sing, N. Y.		×					×			×		2 larvæ of small beetle.
48	♀ im.	July 14	do		×					×					
97	♀ ad.	July 25	do	×						×			×		Jaws of several small caterpillars: 1 snout beetle; wings and legs of another small beetle.
123	♀ ad.	July 28	do					×		×		×		×	Remains of 1 small dung-beetle; remains of 1 small bee or wasp.
201	♀ ad.	Aug. 10	do											×	Traces of a small insect, probably a beetle.
202	♂ im.	do	do							×			×		Remains of 2 snout-beetles.
216	♀	do	do							×				×	Remains of 1 small dung-beetle.
289	♂ im.	Aug. 20	do							×				×	Remains of 1 bug.
356	♀ im.	Aug. 29	do			×									
803	♀ ad.	Sept. 22	do							×					
929	♂ im.	Oct. 2	do	×	×					×					
1190	♂ ad.	Oct. 26	do							×					
1191		do	do							×					
1192	♀	do	do		×					×					
1552	♀	May 9	Taunton, Mass.		×							×			A single fragment of a dung-beetle.
1593	♂	June 16	do							×			×		4 large grubs of a May-beetle; fragments of 2 small beetles.
1642	♀	Nov. 20	do							×					
3360	♂	1886. Mar. 19	Sugar Grove, Ohio.							×		×			Broken parts of 1 dung-beetle.
1215	♂	1885. Oct. 30	Washington, D. C.					×		×					
1453	♂	Sept. 20	Redford, Mich.							×					
1693	♂	Oct. 19	Calhoun, Ga.							×					
1949	♂	Oct. 30	West Chester, Pa.							×					

Contents of stomachs of English Sparrows (*Passer domesticus*)—Continued.

Catalogue number.	Sex and age.	Date of capture	Locality.	Cereals.			Fruit seed.	Grass seed.	Weed seed.	Undetermined vegetable matter.	Bread, rice, etc.	Insect food.			
				Wheat.	Oats.	Corn (maize).						Beneficial species.	Noxious species.	Indifferent species.	Kind of insect.
3061	ad.	1886. Mar. 14	West Chester, Penn.	×	...	...	...	...	...	...	...	...	...	...	
3390	♂ ad.	May 3	Portland, Conn	...	×	×	...	...	...	...	...	...	...	...	
3452	....	1881. Mar. 3	London, Canada	...	×	...	...	...	...	...	...	...	...	...	
3453	....	Apr. 30	do	×	...	...	...	...	...	×	...	...	...	...	
3613	♀	1886. Mar. 26	Taunton, Mass	...	...	...	...	...	...	×	...	...	...	...	
3614	♀	do	do	...	...	×	...	...	...	×	...	...	...	...	
3615	♀	do	do	...	...	...	...	...	...	×	...	...	...	...	
3616	♂	do	do	...	...	...	...	...	...	×	...	...	...	...	
3619	♂	Apr. 15	do	...	...	...	...	...	...	×	...	...	...	...	
3620	♂	do	do	×	...	...	...	...	...	...	...	...	...	...	
3621	♀	do	do	...	...	...	...	...	...	×	...	...	...	...	
3686	juv.	May 14	Atlanta, Ga	...	...	...	...	...	...	×	...	...	...	...	
3702	....	May 24	do	...	×	...	...	...	...	...	...	...	...	...	
3723	♂	Jan. 1	Philadelphia, Pa.	×	×	...	...	...	...	×	...	...	...	...	
4671	♀	Apr. 6	New York City	...	×	...	...	...	...	×	...	...	...	...	
4672	♂	do	do	...	×	...	...	...	...	×	...	...	...	...	
4682	♂	Apr. 9	Fort Hamilton, N. Y.	...	...	...	...	...	...	×	...	...	...	...	
4711	♀	Apr. 21	Van Cortlandt, N. Y.	...	...	...	...	...	...	×	...	...	...	...	
4712	♂	do	do	...	...	...	...	...	...	×	...	...	...	...	
4713	♂	do	do	×	...	...	...	...	...	...	...	...	...	...	
4714	♀	Apr. 23	West Farms, N. Y.	...	...	...	...	...	...	×	...	...	...	...	
4749	♀	May 6	New York City	...	×	...	...	...	...	×	...	...	...	...	
4839	♀	May 29	do	...	×	...	...	...	...	...	...	...	...	...	
4850	♂	June 16	Hartsdale, N. Y.	...	×	...	...	...	...	...	...	...	...	...	
4851	♂	do	do	...	×	...	...	...	...	×	...	...	...	...	
5060	juv.	1887. June 14	Washington, D. C.	...	×	...	...	...	...	×	...	...	...	...	
5761	♀ ad.	Apr. 15	Syracuse, N. Y.	...	...	...	...	...	...	×	...	...	...	...	
5763	♂ ad.	Apr. 18	do	...	×	...	...	...	...	...	...	...	...	...	
5764	♀ ad.	do	do	×	...	...	...	...	...	...	...	...	...	...	
5765	♀ ad.	do	do	...	...	...	...	...	...	×	...	...	...	...	
5766	♀ ad.	do	do	...	...	...	...	...	...	×	...	...	...	...	
5767	♀ ad.	do	do	...	...	...	...	...	...	×	...	...	...	...	
5768	♂ ad.	Apr. 19	do	...	...	...	...	...	...	×	...	...	...	...	
5769	♀ ad.	Apr. 20	do	...	×	...	...	...	...	×	...	...	...	...	
5770	♂ ad.	Apr. 21	do	...	×	...	...	...	...	×	...	...	...	...	
5779	♂ ad.	May 9	do	...	...	...	...	...	...	×	...	...	...	...	
4026	♀	1886. July 15	East Hartford, Conn.	...	...	×	...	×	...	×	...	...	...	...	
4030	♂	July 26	do	...	×	...	...	...	...	×	...	...	...	...	
4031	♂	July 30	do	...	×	...	...	...	...	...	...	...	...	...	
4032	♀	Aug. 3	do	...	×	...	...	...	...	...	...	...	...	...	
4033	♀	Aug. 4	do	...	...	...	...	...	...	×	...	...	...	...	
5523	♀ ad.	1887. May 12	Washington, D. C.	...	...	...	...	...	...	×	...	×	×	...	Pieces of legs of 1 ichneumon fly [?]; 1 snout-beetle.
5524	...	May 13	do	...	×	...	...	...	...	...	...	...	...	...	
5525	♀ ad.	do	do	...	×	...	...	...	...	...	...	...	...	...	
5526	♂ juv.	May 16	do	...	...	...	...	...	...	...	×	×	×	...	Parts of leg of May-beetle; 1 wasp.
5527	♀ juv.	May 20	do	...	...	...	×	...	...	...	×	...	...	...	
5528	♂ juv.	do	do	...	...	...	...	...	...	...	...	...	×	...	Pieces of several May-beetles.
5529	♂ juv.	do	do	...	...	...	...	...	...	...	...	...	×	...	Pieces of May-beetle.
5530	♀ juv.	May 28	do	...	×	...	...	...	...	...	...	...	...	...	
5681	♀ juv.	June 21	do	...	×	...	...	...	×	...	...	...	...	...	
5682	♂ juv.	do	do	...	×	...	...	...	...	...	...	...	...	...	
5683	♂	do	do	...	...	...	×	...	×	×	...	...	...	...	
5684	♂	do	do	...	×	...	...	...	...	...	...	...	...	...	

Contents of stomachs of English Sparrows (Passer domesticus)—Continued.

Catalogue number.	Sex and age.	Date of capture.	Locality.	Cereals.			Fruit seed.	Grass seed.	Weed seed.	Undetermined vegetable matter.	Bread, rice, etc.	Insect food.			
				Wheat.	Oats.	Corn (maize).						Beneficial species.	Noxious species.	Indifferent species.	Kind of insect.
5689	♂ im.	1886. July 12	Washington, D.C.	...	×	...	...	...	×	...	...	...	...	...	
5690	♂ im.	do	do	...	×	...	...	...	×	...	...	...	...	...	
5691	♂ im.	do	do	...	×	...	...	...	×	...	...	...	...	...	
5692	♂ im.	do	do	...	×	...	...	...	×	...	...	...	...	...	
5636	...	Apr. 21	Rockville, Conn.	...	×	...	...	...	...	...	...	×	×	...	Remains of 1 dung-beetle; 1 other small beetle.
5637	...	do	do	...	×	...	...	...	...	...	...	...	...	...	
5638	...	do	do	...	×	...	...	...	...	...	...	...	...	...	
5687	juv.	July 4	Ann Arbor, Mich.	...	...	...	...	...	...	×	...	...	...	...	
5688	juv.	do	do	...	×	...	...	...	...	×	...	...	...	...	
5959	♂	Apr. 22	Amherst, Mass.	...	×	...	...	...	...	×	...	...	...	...	
5725	♂	Jan. 20	West Chester, Pa.	...	×	...	...	...	×	×	×	...	...	...	
5726	♂	1886. Dec. 31	do	...	×	×	...	...	...	×	...	...	...	...	
5727	♂ ad.	1887. Feb. 20	do	...	...	×	...	...	...	×	...	...	...	...	
5728	♂ ad.	do	do	...	...	×	...	...	...	×	...	...	...	...	
5729	♂ ad.	do	do	...	×	×	...	...	...	×	...	...	...	...	
5730	♂ ad.	do	do	...	...	×	...	...	...	×	...	...	...	...	
5731	♂ ad.	do	do	...	...	×	...	...	...	×	...	...	...	...	
5732	♂ ad.	do	do	...	...	...	...	...	...	×	...	...	...	...	
5733	♀ ad.	do	do	...	×	...	...	...	...	...	...	...	...	...	
5734	♀ ad.	do	do	...	...	×	...	...	...	×	...	...	...	...	
5735	♀ ad.	do	do	...	...	×	...	...	...	×	...	...	...	...	
5736	♀ ad.	do	do	...	...	×	...	...	...	×	...	...	...	...	
5737	♀ ad.	do	do	...	...	...	×	...	...	×	...	...	...	...	
5738	♀ ad.	do	do	...	...	×	...	...	...	×	...	...	...	...	
5739	♀ ad.	do	do	...	×	...	...	...	...	×	...	...	...	...	
5740	♀ ad.	do	do	...	...	...	...	...	...	×	...	...	...	...	
5741	♀ ad.	do	do	×	×	...	...	...	...	×	...	...	...	...	
5742	♀ ad.	do	do	...	...	×	...	...	...	×	...	...	...	...	
5743	♀ ad.	Mar. 18	do	...	×	...	...	...	...	×	...	...	...	...	
5744	♀ ad.	do	do	...	×	...	...	...	...	...	...	...	...	...	
5745	♀ ad.	do	do	...	...	...	...	...	...	×	...	...	...	...	
5746	♀ ad.	do	do	...	×	...	...	...	...	...	...	...	...	...	
5747	♀ ad.	do	do	...	×	...	...	...	...	×	...	...	...	...	
5748	♀ ad.	do	do	...	×	...	...	...	...	×	...	...	...	...	
5749	♀ ad.	do	do	...	...	...	...	...	...	×	...	...	...	...	
5750	♀ ad.	do	do	...	×	...	...	...	...	...	...	...	...	...	
5751	♀ ad.	do	do	...	...	...	...	...	...	×	...	...	...	...	
5752	♂ ad.	do	do	...	...	...	...	...	...	×	...	...	...	...	
5753	♂ ad.	do	do	...	×	...	...	...	...	...	...	...	...	...	
5754	♂ ad.	do	do	...	×	×	...	...	...	...	...	...	...	...	
5755	♂ ad.	do	do	...	×	...	...	...	...	×	...	...	...	...	
5756	♂ ad.	do	do	...	×	...	...	...	...	...	...	...	...	...	
1939	♀ im.	1885. Oct. 29	do	...	...	×	...	...	...	×	...	...	...	...	
1942	♂ ad.	do	do	...	...	...	...	...	...	×	...	...	...	...	
1943	♀ ad.	Oct. 30	do	...	...	...	...	×	...	×	...	...	...	...	
1944	♀ ad.	do	do	...	...	...	...	...	...	×	...	...	...	...	
1945	♂ ad.	do	do	...	...	...	...	...	...	×	...	...	...	...	
1946	♂ ad.	do	do	...	...	...	...	×	...	×	...	...	...	...	
1947	♂ ad.	do	do	...	×	...	...	...	...	×	...	...	...	...	
1533	...	Sept. 9	Alfred Centre, N. Y.	...	×	...	...	...	...	×	...	...	...	...	
1600	♀	Aug. 29	Taunton, Mass.	...	×	...	...	...	...	×	...	...	...	...	
1641	...	Nov. 20	do	...	...	...	...	...	...	×	×	...	...	...	
1803	♂ ad.	Dec. 1	Chester Co., Pa.	...	...	×	...	...	...	...	...	...	...	...	
2029	♀	1886. Feb. 13	Amherst, Mass.	...	×	...	...	...	...	×	...	...	...	...	
2074	♂ juv.	May 22	Washington, D.C.	...	...	...	...	...	...	×	...	...	...	...	
2130	♀ ad.	July 28	do	...	×	...	...	...	...	...	...	...	...	...	
2131	♀ ad.	Aug. 3	do	...	×	...	...	...	...	...	...	...	×	...	1 snout-beetle.

Contents of stomachs of English Sparrows (Passer domesticus)—Continued.

Catalogue number.	Sex and age.	Date of capture.	Locality.	Cereals.			Fruit seed.	Grass seed.	Weed seed.	Undetermined vegetable matter.	Bread, rice, etc.	Insect food.			
				Wheat.	Oats.	Corn (maize).						Beneficial species.	Noxious species.	Indifferent species.	Kind of insect.
2132	♀ ad.	1886. Aug. 3	Washington, D. C.		×								×		1 moth with eggs; 2 pairs of jaws (of caterpillar?).
2133	♀ ad.	...do	...do		×								×		1 snout-beetle
2148		July 31	Gainesville, Va.												(Empty.)
5693	♀ im.	1887. July 12	Washington, D. C.		×							?			Very small pieces of a wasp.
5694	im.	...do	...do		×				×						
5695	♀ im.	...do	...do			×									
5696	♀ ad.	...do	...do		×										
5697	♀ ad.	...do	...do							×					
5698	♂ ad.	...do	...do		×										
5699	♂ ad.	July 13	...do							×					
5700	♂ ad.	...do	...do		×										
5701	♀ ad.	...do	...do		×								×	×	11 flea-beetles; 1 leaf flea-beetle.
5702	♀	...do	...do		×				×						
5703	♀ im.	...do	...do		×				×						
5704	♂ im.	...do	...do		×			×	×						
5705	♀ im.	...do	...do		×							×		×	Remains of a wasp.
5706	♂ im.	...do	...do		×										
5707	♂ juv.	...do	...do							×					
5708	♂ ad.	July 14	...do		×										
5531	♂ ad.	May 28	...do					×		×					
5532	♂ juv.	...do	...do		×							×	×	×	1 spider; 1 snout-beetle; 2 ants; 1 bee; 1 small, parasitic fly.
5533	♂ ad.	June 2	...do		×						×	×	×		1 spider; 1 snout-beetle.
5534	♂	...do	...do			×									
5535	♂	...do	...do	×	×										
5536	♂	...do	...do		×								×	×	1 snout-beetle; 5 flea-beetles.
5537	♀	...do	...do		×							×	×	×	2 spiders; 2 snout-beetles; 2 flea beetles.
5538	♀	...do	...do							×			×		Several snout-beetles.
5539	♀	...do	...do		×										
5540	♀	...do	...do			×									
5541	♀	...do	...do		×										
5542	♀	...do	...do		×							×			2 pupæ of blue-bottle fly.
5543	♀	...do	...do		×										
5544	♀	...do	...do							×			×		1 snout-beetle; pieces of larva of a leaf-hopper.
5545	♂ im.	June 3	...do							×		×	×		Numerous spiders; 3 snout-beetles; 1 wasp.
5546	♀ im.	June 4	...do						×	×					
5547	♀ ad.	June 7	...do		×					×					
5548	♂ juv.	...do	...do		×				×				×		1 May beetle; 1 snout-beetle.
5549	♀ ad.	...do	...do			×			×				×		1 snout-beetle.
5550	♀ ad.	June 8	...do		×										
5551	♀ juv.	...do	...do		×										
5552	♀ ad.	June 9	...do		×										
5553	♂ ad.	...do	...do		×	×									
5554	♂ ad.	...do	...do		×										
5555	♂ ad.	...do	...do		×										
5619	♂ juv.	June 11	...do		×										
5661	♂ ad.	June 15	...do		×										
5662	♀ juv.	...do	...do				×		×			?		×	1 flea-beetle; traces of a bee or wasp.
5665	♂ juv.	June 16	...do				×							×	Very small pieces of a hymenopteron.

Contents of stomachs of English Sparrows (Passer domesticus)—Continued.

Catalogue number.	Sex and age.	Date of capture.	Locality.	Cereals.			Fruit seed.	Grass seed.	Weed seed.	Undetermined vegetable matter.	Bread, rice, etc.	Insect food.			
				Wheat.	Oats.	Corn (maize).						Beneficial species.	Noxious species.	Indifferent species.	Kind of insect.
5666	♀juv.	1887. June 16	Washington, D. C.	...	×	...	...	...	...	...	...	...	...	...	
5669	♀juv.	June 17	...do	...	...	...	×	...	...	×	...	...	...	...	
5670	♀juv.	...do	...do	...	×	...	...	...	...	...	...	...	...	...	
5671	♂juv.	...do	...do	...	×	...	...	...	...	...	...	...	...	...	
5672	♂juv.	...do	...do	...	×	...	...	...	×	...	...	...	...	...	
5673	♂juv.	June 20	...do	...	×	...	...	...	...	×	...	...	...	...	
5676	♀ ad.	June 21	...do	...	×	...	...	...	...	...	...	×	...	...	6 house flies, with numerous eggs.
5677	juv.	...do	...do	...	×	...	...	...	×	...	...	...	...	...	
5678	♀juv.	...do	...do	×	...	...	...	...	...	...	...	...	...	...	
5679	♀	...do	...do	...	×	...	...	...	×	...	...	...	...	...	
5680	♀juv.	...do	...do	×	×	...	...	...	...	...	...	...	...	...	
5709	♂ ad.	July 14	...do	...	×	...	...	...	...	...	...	...	...	...	
5710	♀ ad.	...do	...do	...	×	...	...	...	...	...	...	...	...	...	
5711	♀ im.	...do	...do	...	×	...	×	...	×	...	...	...	...	...	
5712	♀ im.	...do	...do	...	×	...	...	...	×	...	...	×	...	×	Leg of spider; leg of beetle; part of wasp; part of another small hymenopteron.
5713	♀ im.	...do	...do	...	...	...	...	...	×	...	...	×	...	×	2 wasps; several flea-beetles.
5714	♂ im.	...do	...do	...	×	...	...	×	×	...	...	...	...	...	
5715	♂ ad.	July 15	...do	...	×	...	...	...	×	...	...	...	...	...	
5716	♂ ad.	...do	...do	...	×	...	...	×	...	...	...	...	...	...	
5717	♂ im.	...do	...do	...	×	...	...	×	...	...	...	...	...	...	
5718	♀ im.	...do	...do	...	×	...	×	...	×	...	...	...	...	...	
5719	♀ ad.	...do	...do	...	×	...	...	...	×	...	×	...	...	...	
5720	♀juv.	...do	...do	...	...	...	...	...	...	...	...	×	...	...	Numerous wasps; traces of a bug.
5721	im.	...do	...do	...	×	...	...	...	×	...	...	...	...	...	
5722	♀ im.	...do	...do	...	×	...	...	...	×	...	...	...	...	...	
5723	♂ im.	...do	...do	...	×	...	...	...	×	...	...	...	...	...	
5724	♂ im.	...do	...do	...	×	...	...	...	×	...	...	...	...	...	
5916	♂ ad.	Aug. 9	...do	...	×	...	...	...	...	...	...	...	×	...	2 snout-beetles.
5917	♀ ad.	...do	...do	...	×	...	...	...	...	...	...	...	×	...	2 snout-beetles.
5918	♂ im.	...do	...do	...	×	...	×	...	...	...	...	...	...	...	
5919	♂ im.	...do	...do	...	×	×	...	×	×	...	...	...	...	...	
5920	♂ im.	...do	...do	...	...	×	×	...	×	...	...	...	...	...	
5921	♀ im.	...do	...do	...	×	×	...	...	×	...	...	...	...	...	
5922	♂ im.	...do	...do	...	...	×	...	...	...	×	...	...	...	...	
5923	♂ im.	...do	...do	...	×	...	×	×	×	...	...	...	...	...	
5924	♂ im.	...do	...do	...	×	×	×	×	×	...	...	...	×	×	Many flea-beetles; legs of snout-beetle.
5925	♂ im.	...do	...do	...	×	...	...	...	...	...	...	...	...	...	
5928	♂ ad.	Aug. 10	...do	...	×	...	...	...	...	...	...	...	...	...	
5929	♂ im.	...do	...do	...	×	...	...	×	×	...	...	...	...	...	
5930	♂ im.	...do	...do	...	×	...	...	...	×	...	...	...	...	...	
5931	♂ im.	...do	...do	...	...	×	...	...	×	...	...	...	...	...	
5932	♂ im.	...do	...do	...	×	...	...	×	...	...	...	...	...	...	
5933	♀ im.	...do	...do	...	×	...	...	×	...	...	...	...	...	...	
5934	♀ im.	...do	...do	...	×	...	...	...	×	...	...	...	...	...	
5935	♂ ad.	Aug. 11	...do	...	×	...	...	...	...	...	...	...	...	...	
5936	♂ im.	...do	...do	...	...	...	×	...	×	...	...	...	...	...	
5937	♂ im.	...do	...do	...	×	...	...	×	×	...	...	...	...	...	
5938	♂ im.	...do	...do	...	×	...	...	...	×	...	...	...	...	...	
5939	♂ im.	...do	...do	...	×	...	...	×	×	...	...	...	...	...	
5940	♂ im	...do	...do	...	×	...	×	×	×	...	...	×	...	×	1 flea-beetle; traces of a wasp.
5941	♂ im.	...do	...do	...	×	...	...	...	×	...	...	×	...	...	Remains of a wasp.
5942	♀ im.	...do	...do	.	...	...	...	×	...	...	...	...	...	...	
5943	♀ im.	...do	...do	...	×	...	...	×	...	...	...	...	...	...	
5944	♀ im.	...do	...do	...	×	×	×	...	×	...	...	...	...	...	
5945	♂ im.	Aug. 12	...do	...	×	...	...	...	...	...	×	×	...	...	Remains of 1 wasp.
5946	♀ im.	...do	...do	...	×	...	...	...	×	...	×	×	×	×	1 snout-beetle; 1 wasp; 2 small caterpillars; flea-beetle.

Contents of stomachs of English Sparrows (Passer domesticus)—Continued.

Catalogue number.	Sex and age.	Date of capture.	Locality.	Cereals.			Fruit seed.	Grass seed.	Weed seed.	Undetermined vegetable matter.	Bread, rice, etc.	Insect food.			
				Wheat.	Oats.	Corn (maize).						Beneficial species.	Noxious species.	Indifferent species.	Kind of insect.
		1887.													
5947	♂ im.	Aug. 11	Washington, D. C.	...	×	...	...	×	...	...	×	...	...	...	
5948	♂ ad.	...do	...do	...	×	...	...	×	×	...	...	...	...	...	
5949	♀ ad.	...do	...do	...	...	...	×	×	...	...	...	...	...	...	
5950	♂ im.	...do	...do	...	×	...	...	...	...	...	...	...	...	...	
5951	♂ im.	...do	...do	...	...	...	...	×	...	...	...	×	×	...	1 snout-beetle; 1 wasp.
5952	♂ im.	...do	...do	...	×	...	...	×	...	...	...	...	...	...	
5953	♀ ad.	...do	...do	...	×	...	...	...	×	...	...	?	...	...	Remains of 1 hymenopteron (wasp?).
5954	♂ im.	...do	...do	...	×	...	...	...	...	...	...	...	×	...	1 tree-hopper.
5966	♀ ad.	Aug. 13	...do	...	...	...	×	...	...	...	...	...	...	...	
5967	♀ ad.	...do	...do	...	×	...	...	...	×	...	...	...	×	...	1 tree-hopper; 2 winged ants (females).
5968	♀ ad.	...do	...do	...	×	...	×	...	...	...	...	...	...	...	
5969	♀	...do	...do	...	×	×	...	...	...	...	...	...	...	...	
5970	♀	...do	...do	...	×	...	...	...	...	...	...	×	...	×	2 wasps; 3 flea-beetles.
5971	♀ im.	...do	...do	...	...	...	×	×	...	...	...	×	×	...	Remains of 1 ant; 2 wasps.
5972	♂ im.	...do	...do	...	...	...	×	×	...	...	...	×	×	...	Parts of legs of May beetle; 2 wasps.
5973	♂ im.	...do	...do	...	×	...	...	×	...	...	...	...	×	...	1 leg of mole-cricket.
5974	♀ im.	Aug. 15	...do	...	×	...	...	×	...	×	...	...	...	...	
5975	juv.	...do	...do	...	...	...	×	...	...	...	...	×	×	...	4 ants; remains of several wasps.
5976	juv.	...do	...do	...	×	...	...	...	...	...	×	×	×	...	5 ants; 1 wasp.
5977	♂ im.	...do	...do	...	×	...	×	...	...	...	...	×	...	...	Very minute remains of several wasps.
5978	♂ im.	...do	...do	...	×	...	...	×	×	...	...	...	...	...	
5979	♂ im.	...do	...do	...	×	×	...	...	×	...	...	...	...	...	
5980	♂ ad.	...do	...do	...	×	...	...	...	...	...	...	...	...	...	
5981	♀ ad.	...do	...do	...	...	×	...	...	...	×	...	...	...	...	
5982	♀	...do	...do	...	×	×	×	...	...	...	...	×	...	...	1 wasp.
5983	♀	...do	...do	...	×	...	...	...	...	...	...	...	...	...	
5987	♂ ad.	Aug. 16	...do	...	×	×	...	...	...	...	...	...	...	...	
5988	♂ ad.	...do	...do	...	×	×	...	...	×	...	...	...	...	...	
5989	♂	...do	...do	...	×	...	...	...	×	...	...	...	...	...	
5990	♂	...do	...do	...	×	...	...	...	×	...	×	...	...	...	
5991	♂	...do	...do	...	×	...	...	...	...	×	...	...	...	...	
5992	♂ im.	...do	...do	...	...	...	×	...	...	...	...	...	...	...	
5993	♂ im.	...do	...do	...	×	...	...	×	...	...	...	...	...	...	
5994	♂ im.	...do	...do	...	×	×	...	×	...	...	...	...	...	...	
5995	♂ im.	...do	...do	...	×	...	...	...	...	...	...	...	...	...	
5996	♂ im.	...do	...do	...	×	...	...	...	...	...	...	...	...	...	
5997	♀ im.	...do	...do	...	×	...	...	...	...	×	...	...	...	...	
5998	♀ im.	...do	...do	...	×	...	...	...	...	...	...	...	...	...	
5999	♀ im.	...do	...do	...	×	...	×	...	...	...	...	...	...	...	
6000	♀ im.	...do	...do	...	×	...	...	...	...	...	...	×	...	...	Remains of 1 wasp
6001	♀ ad.	...do	...do	...	...	×	...	...	...	...	...	...	...	...	
6002	♀ ad.	...do	...do	...	×	...	...	...	...	...	...	...	...	...	
6003	♀ im.	...do	...do	...	×	...	...	...	...	×	...	...	...	...	
6102	♂	Aug. 20	...do	...	×	...	...	...	...	...	...	...	...	...	
6103	♂	...do	...do	...	×	...	×	...	×	...	...	...	...	...	
6104	♂	...do	...do	...	×	...	...	...	...	×	...	...	...	...	
6105	♂	...do	...do	...	×	...	...	×	...	...	...	...	...	...	
6106	♀ juv.	...do	...do	...	×	...	...	×	...	...	...	...	...	...	
6107	♀ juv.	...do	...do	...	×	×	...	...	...	...	...	...	...	...	
6108	♀ juv.	...do	...do	...	...	×	...	...	...	...	...	...	×	...	Remains of 3 cut-worms.
6109	♀ juv.	...do	...do	...	×	...	...	...	...	...	...	×	...	×	1 wasp; 1 *Psocus*.
6110	♀ juv.	...do	...do	...	×	×	...	...	...	...	...	...	×	×	Traces of 1 bee or wasp; 1 flea-beetle.
6111	♀	...do	...do	...	×	...	×	×	×	...	...	...	...	...	
6112	♀	...do	...do	...	×	...	...	...	...	...	...	×	...	×	Remains of 1 wasp.
6113	♀	...do	...do	...	×	...	×	...	...	...	...	...	...	...	

Contents of stomachs of English Sparrows (Passer domesticus)—Continued.

Catalogue number.	Sex and age.	Date of capture.	Locality.	Cereals.			Fruit seed.	Grass seed.	Weed seed.	Undetermined vegetable matter.	Bread, rice, etc.	Insect food.			
				Wheat.	Oats.	Corn (maize).						Beneficial species.	Noxious species.	Indifferent species.	Kind of insect.
6114	♀	1887. Aug. 20	Washington, D. C.	...	×	...	×	...	×	...	...	...	...	...	
6115	♀	...do	...do	...	×	...	...	...	...	...	...	...	...	...	
6116	♀	...do	...do	...	...	...	×	...	...	...	...	...	...	...	
6117	♀	...do	...do	...	×	...	×	...	×	...	...	...	...	...	
6118	♀	...do	...do	...	...	...	...	×	×	...	...	...	...	...	
6084	♂ ad.	Aug. 19	...do	...	×	...	...	...	...	...	...	...	...	...	
6085	♂	...do	...do	...	×	...	...	...	×	...	...	...	...	...	
6086	♂	...do	...do	...	...	...	×	...	...	...	...	...	...	...	
6087	♂	...do	...do	...	×	...	...	...	...	...	...	×	...	...	Legs of 1 ichneumon fly [?]
6088	♂ juv.	...do	...do	...	×	...	...	...	...	...	...	×	...	...	Many wasps.
6089	♀ ad.	...do	...do	...	...	...	...	...	...	...	×	...	×	...	1 snout-beetle; 2 small jaws (of caterpillar?).
6090	♀	...do	...do	...	×	...	...	×	...	...	×	×	...	...	2 small bees.
6091	♀	...do	...do	...	...	...	×	...	...	...	...	×	...	...	1 wasp.
6092	♀	...do	...do	...	×	...	...	...	×	...	...	×	...	...	Remains of 2 wasps.
6093	♀	...do	...do	...	×	...	×	...	×	...	×	×	...	×	1 ant; 1 wasp.
6094	♀	...do	...do	...	×	...	×	...	...	...	...	...	...	...	
6095	♀	...do	...do	...	×	...	×	...	...	...	...	...	...	...	
6096	♀	...do	...do	...	...	...	×	...	...	...	...	...	...	...	
6097	♀	...do	...do	...	×	...	...	...	...	×	...	...	...	...	
6098	♀	...do	...do	...	×	...	...	...	...	...	...	...	...	...	
6004	♂ ad.	Aug. 17	...do	...	×	...	...	×	...	...	×	...	...	×	Remains of a few small ants.
6005	♂ im.	...do	...do	...	...	...	...	×	...	×	...	...	...	...	
6006	♂ im.	...do	...do	...	...	...	...	×	×	×	...	...	...	...	
6007	♂ im.	...do	...do	...	×	...	×	...	...	...	...	...	...	×	Very small pieces of a hymenopteron.
6008	♂ im.	...do	...do	...	...	...	...	×	...	...	...	...	...	...	
6009	♂ juv.	...do	...do	...	...	...	×	×	...	...	...	...	...	...	
6010	♀	...do	...do	...	×	...	...	×	×	...	...	×	...	...	1 wasp.
6011	♀	...do	...do	...	×	...	×	...	...	...	...	...	...	...	
6012	♀	...do	...do	...	×	...	...	...	...	×	...	×	×	...	1 wasp; 5 jaws of a grasshopper.
6013	♀	...do	...do	...	×	...	...	×	×	...	...	...	...	...	
6014	♀	...do	...do	...	...	...	×	×	×	...	...	...	...	...	
6015	♀ ad.	...do	...do	...	...	...	...	...	...	×	...	...	×	...	1 moth (of web-worm?).
6016	♀	...do	...do	...	×	...	...	×	×	...	...	...	...	...	
6017	♀	...do	...do	...	×	...	...	...	...	...	...	...	...	...	
6018	♀	...do	...do	...	×	...	...	...	...	...	...	...	×	...	2 snout-beetles; part of leg of May-beetle.
6019	♂ ad.	Aug. 18	...do	...	×	...	...	...	...	...	×	...	...	...	
6020	♂	...do	...do	...	×	...	...	...	×	...	...	...	...	...	
6021	♂	...do	...do	...	×	...	...	×	...	...	...	×	...	...	1 wasp.
6022	♂	...do	...do	...	...	...	×	×	...	...	...	...	...	...	
6023	♀ ad.	...do	...do	...	×	...	...	×	...	...	...	...	...	...	
6024	♀	...do	...do	...	×	...	...	...	...	...	...	...	...	...	
6025	♀	...do	...do	...	×	...	...	...	...	...	...	×	...	...	4 bees (of two kinds).
6026	♀	...do	...do	...	×	...	...	...	...	×	...	×	...	...	Remains of 1 wasp.
6229	♀	Aug. 29	...do	...	×	...	...	...	...	...	...	×	...	×	Remains of 1 wasp; 1 flea-beetle.
6230	♀	...do	...do	...	×	...	...	...	...	×	...	...	...	...	
6231	♂	Aug. 30	...do	...	...	...	...	×	...	×	...	...	...	...	
6232	♂	...do	...do	...	×	×	...	...	...	...	...	...	...	...	
6233	♂	...do	...do	...	×	...	...	...	...	...	...	...	...	...	
6234	♂	...do	...do	...	×	...	...	...	...	×	...	...	...	...	
6235	♀	...do	...do	...	×	...	...	...	...	...	...	...	...	...	
6236	♀	...do	...do	...	×	...	...	×	...	...	...	...	...	...	
6237	♀	...do	...do	×	...	...	×	...	...	×	...	...	...	...	
6238	♀	...do	...do	...	×	...	...	...	...	...	...	...	...	...	
6239	♀	...do	...do	×	×	...	...	...	...	...	...	...	...	...	
6240	♀	...do	...do	...	×	...	...	...	...	×	...	...	...	...	
6136	♂	Aug. 23	...do	...	×	...	...	...	...	×	...	...	...	...	
6137	♂	...do	...do	...	×	...	...	×	...	...	...	...	...	...	

Contents of stomachs of English Sparrows (*Passer domesticus*)—Continued.

Catalogue number.	Sex and age.	Date of capture.	Locality.	Cereals.			Fruit seed.	Grass seed.	Weed seed.	Undetermined vegetable matter.	Bread, rice, etc.	Insect food.			
				Wheat.	Oats.	Corn (maize).						Beneficial species.	Noxious species.	Indifferent species.	Kind of insect.
6138	♂	1887. Aug. 23	Washington, D. C.	rye				×							
6139	♂	do	do		×										
6140	♂	do	do				×	×							
6141	♂	do	do				×			×		×			1 wasp.
6142	♀	do	do				×			×					
6143	♀	do	do		×	×									
6144	♀	do	do		×			×							
6145	♀	do	do				×								
6146	♀	do	do		×			×		×					
6147	♂ ad.	Aug. 24	do		×					×					
6148	♂ ad.	do	do				×	×	×						
6149	♂	do	do		×					×					
6150	♂	do	do			×			×	×					
6151	♂	do	do		×				×					×	1 flea-beetle.
6152	♂	do	do		×		×		×						
6153	♂	do	do		×							×		×	Remains of a hymenopteron, and very small pieces of a bug.
6154	♂	do	do		×			×							
6155	♂	do	do				×	×	×						
6156	♂	do	do						×						
6157	♂	do	do		×				×						
6158	♂	do	do		×			×	×						
6159	♂	do	do		×					×					
6160	♂	do	do		×					×					
6161	♀	do	do		×							×			1 wasp.
6162	♀	do	do		×								×		1 small caterpillar.
6163	♀	do	do		×							×			Remains of 1 wasp.
6164	♀	do	do		×				×			×			Remains of 1 wasp.
6125	♂	Aug. 22	do		×		×								
6126	♂	do	do		×			×							
6127	♂	do	do		×	×									
6128	♂	do	do		×				×						
6129	♂	do	do				×								
6130	♀	do	do		×				×						
6131	♀	do	do		×										
6132	♀	do	do		×		×								
6133	♀	do	do		×					×					
6134	♀ juv.	do	do									×	×		Remains of several grasshoppers and 1 wasp.
6135	♀	do	do		×			×							
6099	♂ ad.	Aug. 20	do		×					×					
6100	♂ ad.	do	do		×					×					
6101	♂	do	do		×	×									
6201	♀ juv.	Aug. 26	do							×					
6202	♀ juv.	do	do							×					
6203	♀ juv.	do	do		×		×			×					
6204	♀ juv.	do	do							×			×	×	Remains of 1 cutworm; 1 May-fly; 1 leaf-hopper, and 4 ants.
6205	♀ juv.	do	do		×					×					
6206	♀	do	do		×			×		×					
6207	♀	do	do							×					
6208	♀	do	do		×			×							
6209	♀	do	do					×	×	×					
6210	♀	do	do		×					×					
6211	♂	do	do							×					
6212	♂	do	do		×	×				×					
6213	♂	do	do		×				×	×					
6214	♂	do	do		×					×					
6215	♂	do	do		×			×		×					
6216	♂	Aug. 27	do					×		×					
6217	♂	do	do		×			×	×	×					
6218	♀	do	do		×										
6219	♀	do	do		×										

Contents of stomachs of English Sparrows (*Passer domesticus*)—Continued.

Catalogue number.	Sex and age.	Date of capture.	Locality.	Cereals.			Fruit seed.	Grass seed.	Weed seed.	Undetermined vegetable matter.	Bread, rice, etc.	Insect food.			
				Wheat.	Oats.	Corn (maize).						Beneficial species.	Noxious species.	Indifferent species.	Kind of insect.
6220	♀	1887. Aug. 27	Washington, D. C.	×	×										
6221	♂	Aug. 29	do		×				×						
6222	♂	do	do		×	×									
6223	♂	do	do		×										
6224	♂	do	do		×			×			×				
6225	♂	do	do		×			×							
6226	♂	do	do		×	×									
6227	♀	do	do		×			×							
6228	♀	do	do		×			×							
6241	♂	Sept. 3	do		×										
6242	♂	do	do				×	×							
6243	♂	do	do		×			×							
6244	♂	do	do		×		×	×							
6245	♂	do	do		×										
6246	♂	do	do							×					
6247	♂	do	do		×			×							
6248	♀	do	do					×		×					
6249	♀	do	do			×			×	×					
6250	♀	do	do			×				×					
6251	♀	do	do		* ×	×				×					
6252	♀	do	do		×					×					
6253	♀	do	do	×	† ×										
6254	♀	do	do		×					×					
6255	♀	do	do		×	×									
6256	♀	Sept. 3	do							×				×	Many leaf flea-beetles.
6263		Sept. 5	do		×	×				×					
6264		do	do		‡ ×										
6265		do	do							×					
6266		do	do		×			×							
6267		do	do							×			×		Remains of several small grasshoppers.
6268		do	do		×										
6269		do	do						×	×					
6270		do	do							×					
6271		do	do					×		×					
6272		do	do				×								
6273		Sept. 7	do					×		×					
6535	♂ ad.	Nov. 30	do		×			×		×	×				
6536	♀	do	do					×		×	×				
6564	♂	Dec. 1	do		×			×		×					

* 20 oats in crop.

† 36 oats in crop; 10 in stomach.

‡ 34 oats in crop.

SUMMARY.

The 522 stomachs examined at the Department of Agriculture gave the following results:

Wheat was found in 22 stomachs, oats in 327, corn (maize) in 71, fruit seed (mainly of mulberries) in 57, grass seed in 102, weed seed in 85, undetermined vegetable matter in 219, bread, rice, etc., in 19, noxious insects in 47, beneficial insects in 50, insects of no economic importance in 31.

Doubtless most of the oats found in the stomachs were obtained from horse droppings, and some of the undetermined vegetable matter was from the same source.

Contents of stomachs of English Sparrows (Passer domesticus)—Continued.

[Examined at West Chester, Pa., by Dr. B. H. Warren, Prof. C. B. Cochran, and Benj. M. Everhart.]

Catalogue number.	Sex and age.	Date of capture.	Locality.	Cereals.			Fruit and fruit seed.	Grass seed.	Weed seed.	Undetermined vegetable matter.	Bread, rice, etc.	Buds and blossoms.	Insect food.	Remarks.
				Wheat.	Oats.	Corn (maize).								
1	♂ ad.	1879. Mar. 13	Chester Co., Pa					×						
2	♂ ad	Mar.	do					×						Clover seed.
3	♂ ad.	do	do	×				×						Do.
4	— ad.	do	do	×				×						Blades of grass.
5	— ad.	do	do					×		×				Clover seed.
6	♀ ad.	do	do	×				×						Do.
7	— ad.	do	do					×						Blades of grass.
8	— ad.	do	do					×		×				Clover seed.
9	— ad.	do	do					×		×				Do.
10	♂ ad.	do	do	×						×				Small black seed.
11	♀ ad.	1880. Mar. 1	do			×				×				White corn and small seed.
12		Mar. 3	do	×						×			1 beetle.	Few small black seeds.
13		do	do	×						×	×			Green vegetable matter.
14	♀ ad.	do	do						×			×		Blossoms of pear; seed of bitter-weed.
15	— ad.	do	do	×								×		
16	— ad.	Mar. 4	do							×		×		Small seeds.
17	— ad.	Mar. 12	do			×				×				
18	— ad.	Mar. 15	do	×										
19		Mar. 22	do	×										
20		Mar. 5	do	×						×				
21		Mar. 6	do							×	×			Small black seeds.
22		do	do							×				Small seeds.
23		Mar. 20	do							×				Small seeds and blades of grass.
24		1879. Apr. 3	do	×					×					Seeds of bitter weed.
25		Apr. 5	do							×		×		Small seeds.
26		Apr. 9	do							×				Do.
27		Apr. 25	do			×		×						White corn.
28		do	do					×				×		Buds of pear.
29		Apr. 26	do	×				×						Clover seed.
30		Apr. 30	do	×								×		Buds of haw tree.
31		do	do	×						×				Small black seeds.
32		1880. Apr. 17	do								×			
33		Apr. 26	do							×		×		Seeds.
34		Apr. 23	do							×		×		Small black seeds.
35	♀	Apr. 27				×						×		
36	♂	do		×		×								White corn.
37	♀	do	West Chester, Pa							×		×		Small seeds.
38	♂	Apr. 29	do							×		×		Small black seeds.
39	♂	May 6	do		×									
40	♀	do	do		×									
41	♂	do	do		×									
42	♂	do	do		×									
43	♂	May 7	do							×		×		Buds of haw-tree; few black seeds.
44	♂	May 8	do		×									
45	♀	do	do		×									
46	♂	do	do		×									
47	♂	do	do		×									
48	♂	do	do		×									
49	♀	do	do		×									
50	♂	do	do		×									
51	♀	do	do		×									
52	♂	May 9	do		×									
53	♀	do	do		×									
54	♂	do	do		×									
55		May 20	do								×			Rye bread.
56	♂	do	do								×			Do.
57		do	do			×								White corn.
58	young.	May 23	do										Apterous insects.	

Contents of stomachs of English Sparrows (*Passer domesticus*)—Continued.

Catalogue number.	Sex and age.	Date of capture.	Locality.	Cereals.			Fruit and fruit seed.	Grass seed.	Weed seed.	Undetermined vegetable matter.	Bread, rice, etc.	Buds and blossoms.	Insect food.	Remarks.
				Wheat.	Oats.	Corn (maize).								
59		1880. May 25	West Chester, Pa		×									
60		May 29	do		×									
61		do	do		×					×				
62		do	do		×					×				
63		do	do		×					×				
64		do	do		×									
65		1879. June 8	do								×			
66		do	do											Stomach empty.
67		June 20	do	×	×									
68	♀ ad.	June 15	do							×	×			Ginger-bread and green vegetable matter.
69	♂ yg.	do	do								×			Ginger-bread.
70	♂	1880. Sept. 4	do							×	×			Green leaves.
71	♀	Sept. 5	do		×									
72	♀	do	do		×									
73	♂	Sept. 7	do		×									
74	♂	Sept. 13	do										1 potato beetle.	
75	♂	do	do										Flies.	
76	♀	Sept. 22	do								×			
77	♀	do	do								×			
78	♂	do	do					×						Seed of fox-tail grass.
79		do	do					×						Do.
80		do	do					×						Do.
81	♂	Oct. 14	do		×									
82	♂	Oct. 15	do		×									
83	♂	Nov. 13	do								×			
84	♂	do	do								×			
85	♀	do	do								×			
86	♂	Nov. 17	do		×									
87	♀	do	do		×									
88		do	do		×									
89		do	do		×	×								
90		do	do		×									
91		Dec. 2	do			×								
92		Dec. 9	do		×									Oats and barley.
93		Dec. 15	do		×									
94		Dec. 29	do	×										
95		1881. Jan. 4	do		×	×								
96		Jan. 20	do			×					×			
97		Jan. 23	do		×		×							Apple.
98	♂	do	do											Orange-peel.
99		do	do	×		×								
100	♀	1882. July 8	do								×			
101		June 1	West Bradford, Pa.	×										24 grains of wheat.
102		do	do	×										
103		do	do			×				×				Small seeds.
104		do	do							×				Green vegetable substance.
105		do	do							×				Do.
106		do	do							×				Do.
107		do	do							×				Do.
108		do	do							×				Do.
109	ad.	June 12	do											Stomach empty.
110	ad.	do	do											Do.
111	♂ ad.	do	do			×		×						Clover seed.
112	♀ ad.	do	do							×			2 flies; 3 aptera.	Green vegetable substance.
113	nestling	do	do											Small mass of cooked beef.
114	nestling	do	do											Stomach empty.

[Notes by Dr. B. H. Warren.]

The various vegetable materials named in the records given above are, with a few exceptions, included in the following list:

Oats (*Avena sativa*).
Wheat (*Triticum vulgare*).
Rye (*Secale cereale*).
Corn, maize (*Zea Mays*).

Grass seed, *Clover seed*, *Small seeds*, etc., refer mainly to the following:

Red clover (*Trifolium pratense*).
White clover (*Trifolium repens*).
Timothy (*Phleum pratense*).
Bitter-weed (*Ambrosia artemisiæfolia*).
Fox-tail grass (*Setaria glauca*). Seeds of other species of *Setaria* are also fed upon.

Buds and blossoms were chiefly of the following kinds:

Pear (*Pyrus communis*).
Plum (*Prunus domestica*).
Cherry (*Cerasus avium*).
Grape (*Vitis*).
Maple (*Acer*).
Black Haw (*Viburnum prunifolium*).

In a few cases remains of the following vegetables were present:

Lima Bean (*Phaseolus lunatus*).
String Bean (*Phaseolus vulgaris*).
Garden Pea (*Pisum sativum*).

Numerous complaints are made by our citizens as to the destruction caused by Sparrows to growing pea-vines.

MISCELLANEOUS INJURIES.

Aside from the damage which the Sparrow occasions to the agriculturist and horticulturist, it is also chargeable with offenses which are regarded by many people as insignificant, but which, nevertheless, sometimes become so marked as to demand immediate attention.

Mention has already been made of the damage which the Sparrow does to foliage by its filthy habits, and this kind of injury extends to various other classes of objects.

No specific questions as to injury by filth were sent out by the Department, but many observers have contributed notes on the subject, and even the most superficial observer knows what endless annoyance and vexation, to say nothing of serious damage, is occasioned by the soiling of window-casings, cornice-brackets, porches, awnings, and ornamental work of every kind about dwelling-houses, business blocks, and public buildings.

Wherever the Sparrow nests this trouble is observable in greater or less degree, but it is by no means limited to nesting-places. Very slight modifications in architecture will often suffice to prevent the Sparrows from nesting about a building, but it is impossible to keep them from perching and roosting everywhere. Even the plainest and barest brick front is likely to suffer, for wherever a window-cap projects a few inches the Sparrows are sure to rest, and defacement is equally sure to follow. In the city of Washington many of the statues and fountains in the public parks are more or less disfigured by the filth of the Sparrow, and in some cases the defilement is so extensive that the statues become positive eye-sores, the filth being conspicuous even at a distance. Sometimes a heavy rain obliterates the stains for a short time, but so long as the cause remains untouched the evil is sure to reappear at more or less regular intervals. In the spring of 1886 a personal examination of the statues in the various parks and squares showed that more than half were thus conspicuously defaced, and further observation shows that almost all are affected at one time or another. A similar state of things is often found in cemeteries where Sparrows are abundant.

Again, the benches and other resting places in parks and squares are so befouled that frequently not one is available, and the adventurous stranger who lingers long in such places is sure to have his apparel, as well as his pleasure, marred by the omnipresent Sparrow.

The rapidity with which these birds collect rubbish in places chosen for nesting purposes is well illustrated by the trouble caused in the city of Washington by their attempts to occupy gas lamps, and even the globes of electric lights, with their nests. During a single day they will almost fill a gas lamp, and although the rubbish is removed regularly they persist in carrying in more.

Capt. Charles Bendire, of this city, has called our attention recently to cedar trees in the Smithsonian grounds which have been denuded almost completely of their bark by the Sparrows. The birds have stripped it off to use for nesting material, and have taken not only the rough outer bark, but much of the thin inner layers, leaving the trunks smooth and shining.

Another cause of complaint is the Sparrow's habit of nesting and roosting in gutters, pipes, and drains of roofs. Large quantities of nesting material are carried into such places and subsequently choke up the pipes, sometimes causing serious overflows. In some cases such trouble is easily remedied, but in most cases the damage is done before the danger is suspected, and it is only possible to prevent a recurrence of the mischief. We append a few examples of the complaints received.

Mr. T. J. Martin, of Waynesborough, Va., writes:

> During the years 1881 and 1882 I was engaged in the tin trade in Lexington, Va., and having considerable roofing and guttering to do, I had a chance to note the damage done by the English Sparrow. Formerly it had been the practice to put heads or ornamental crown-pieces to the down spouts. These heads formed convenient

places for the Sparrows to build their nests, and they choked them up so completely that water could not pass down the spout at all, or only by slow percolation. In consequence these heads either had to be abandoned or completely covered, so that there was no room for the birds to get in. In some cases the Sparrows would fill the gutter and eave troughs with all manner of trash, seemingly using them for a playground, and not for the purposes of nest-building. They caused much annoyance in this respect, as the gutters had to be cleaned two or three times during a year. In fact, I knew one or two persons having groves of trees near their dwellings who kept ladders continually at hand for this purpose. (December 26, 1887.)

Mr. J. T. Connor, of Rome, Ind., writes:

The greatest trouble the Sparrow gives us here is by nesting about our houses, particularly in the spouting and pipes, and obstructing the troughs that lead the water to our cisterns. (November 5, 1886.)

Mr. J. S. Shade, of McConnellsburgh, Pa., writes:

They are a nuisance here, filling the water spouts with their nests, which they rebuild as fast as destroyed. (November 15, 1886.)

Occasionally this habit of the Sparrow may prove dangerous to the health of persons who use cistern water for drinking. Cases are not very infrequent in which severe sickness has resulted from the use of water collected from roofs frequented by domesticated pigeons, and such a result is perfectly possible from the use of water contaminated by filth from Sparrow nests and roosts.

Still another danger from the presence of Sparrows about our houses lies in the possibility of fire resulting from spontaneous combustion among the masses of rubbish carried into out-of-the-way corners about frame buildings. Although there is little probability of such fires originating frequently, yet they are known to have been caused by the material collected by mice, and the following incident, taken from the *Scientific American* of February 26, 1887, seems to show that there is some ground for similar apprehension from the Sparrow:

There is a bar-iron mill situated in a neighboring town, 4 miles from here, that has been on fire three or four times, in which the English Sparrow might be called the incendiary. These sparrows pick up old pieces of cotton waste, which they build into their nests among the timbers of the roof of the mill, and in every case of the fires above mentioned these nests were the cause, either from spontaneous combustion or from sparks from the hot iron striking and lodging in the nest. (R. W. Kear, Pottsville, Pa.)

As an illustration of the capacity of the Sparrow for mischief, we cite the following statement of Mr. H. H. Miller, of Sandy Spring, Md. He writes:

It has become useless to thatch roofs with rye straw here, as the Sparrow wears holes through it, apparently for "pure devilment." I know of several roofs that have been destroyed in this way within the last two or three years. (February 16, 1887.)

Similar injury to thatched roofs is very common in some parts of England, and has been ascribed, as above, to the Sparrow's love of mischief. It seems probable, however, that the injury results from a natural mistake on the part of the birds; for they are accustomed, after cleaning the grain from the outside of stacks, to dig or burrow into the stacks in search of more, and a thatched roof bears no distant resemblance to such a stack stripped of the outside grain.

Among the complaints of miscellaneous injuries from the Sparrow, one of the most frequent relates to its habit of robbing poultry of their food. At first sight the loss thus occasioned would seem to be trifling, but the complaints received show that this is far from being the case. The Sparrows do not eat what the poultry *leave;* they eat *with* the fowls, and soon become so bold that they not only resist the attempts which the fowls make to drive them off, but even make unprovoked attacks on them, sometimes driving them away from the food. As a Sparrow eats more, in proportion to its size, than a hen, and as the Sparrows about a farm-yard frequently outnumber the fowls ten to one, the grain which they thus steal day after day is an item of considerable importance.

Under date of February 27, 1884, Mr. D. C. Beard, of Flushing, N. Y., wrote:

> I know to my sorrow that it lives all winter entirely on grain, for in buying chicken feed I allow two parts for the Sparrows and one for the chickens.

Another observer says that they are so abundant about his place that they "rise in clouds" from his hen-yard; while more than one witness states that when chickens are fed out of doors the Sparrows get more than the fowls. Dr. A. P. Sharp, of Baltimore, states that on his place in Kent County, Md., the Sparrows have learned by experience that it is dangerous to eat grain except with the chickens. He says:

> Formerly I killed a good many of them, but now have tried every means to feed them. They will eat with the chickens, seeming to know that I will not shoot them.

This list of miscellaneous injuries would not be complete without a reference to the voice of the Sparrow. Some notes of the Sparrow are not in themselves unmusical, especially if uttered by single birds and in a low key, but even the most enthusiastic of Sparrow admirers will readily admit that the bird is no singer, and the ceaseless, discordant chatter of a flock of Sparrows about their nesting or roosting places can be characterized only as a nuisance. Those who have been compelled to listen to this noise continually will appreciate the remarks of one of our correspondents who wrote in 1884:

> To many our singing birds form the very poetry of the year; and when they are replaced, or their music is drowned by these noisy and dirty Sparrows, so that half the charm of spring is gone, no little suffering results. The effect upon sick or nervous people of their monotonous and peculiarly untuneful cry is very great. I have often counted a hundred and more successive chirps by one Sparrow, in exactly the same key, a real torture to the ear; and I have known more than one invalid whose morning sleep and needful out-door walk have been quite spoiled by the presence of these birds.

SECTION SECOND.—RECOMMENDATIONS.

RECOMMENDATIONS FOR LEGISLATION.

SUGGESTIONS AS TO THE REPEAL OF OLD LAWS AND THE ENACTMENT OF NEW ONES.

The following recommendations are respectfully submitted to the legislative bodies of the various States and Territories:

(1) The immediate repeal of all existing laws which afford protection to the English Sparrow.

(2) The enactment of laws legalizing the killing of the English Sparrow at all seasons of the year, and the destruction of its nests, eggs, and young.

(3) The enactment of laws making it a misdemeanor, punishable by fine or imprisonment, or both—(*a*) to intentionally give food or shelter to the English Sparrow, except with a view to its ultimate destruction; (*b*) to introduce or aid in introducing it into new localities; (*c*) to interfere with persons, means, or appliances engaged in, or designed for, its destruction or the destruction of its nests, eggs, or young.

(4) The enactment of laws protecting the Great Northern Shrike or Butcher Bird, the Sparrow Hawk, and the Screech Owl, which species feed largely on the English Sparrow.

(5) The enactment of laws providing for the appointment of at least one person holding civil office, preferably the game constable, where such officer exists, in each town or village, who shall serve without additional compensation, and whose duty it shall be to destroy or bring about the destruction of English Sparrows in the streets, parks, and other places where the use of fire-arms is not permitted. In the larger towns and cities this office might be well imposed upon the commissioners of public parks.

In relation to the above recommendations a few remarks may not be out of place.

By reference to the summary of legislation which follows, it will be seen that the existing laws which may affect the Sparrow are not sufficiently explicit in most cases.

In only seven States do the laws mention the English Sparrow specifically. In the State of New York it is a misdemeanor to feed or shelter the Sparrow, and in Michigan a bounty of one cent per head is paid. Massachusets, Rhode Island, New Jersey, Pennsylvania, and Ohio* simply except the English Sparrow from the protection afforded most other small birds.

In twenty-two other States and Territories, which afford more or less protection to small birds, the English Sparrow stands on the same footing with harmless or beneficial birds. In the laws of fifteen States the word "sparrow" is used without qualification, the birds so designated being entitled to protection, except that in the States of Illinois, Kentucky, Louisiana, Missouri, and Nebraska, any person may kill birds on his own land when they endanger his crops.

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* Since this was written, an act offering a bounty of ten cents per dozen for English Sparrows has been passed by the Ohio legislature. (See pp. 171–172.)

In Iowa, Kansas, Mississippi, South Carolina, Tennessee, and Wisconsin, most small birds are protected, and Sparrows are not among those excepted. Eighteen other States and Territories have no laws which have any bearing on the case.

It is evident, therefore, that prompt and vigorous legislation is needed in all States where the English Sparrow has become established, and even those States and Territories not yet infested (if there be any such) would do well to take measures to keep the pest out. Whatever may have been the intention of the framers of laws which protect native sparrows, there can be no question that many people refrain from taking active steps against English Sparrows, through the belief that they are protected under the law. And States whose laws are thus open to misinterpretation ought at once to define clearly the position of the English Sparrow. Moreover, since the most effective warfare on this bird can be waged during the breeding season, any act intended to accomplish its destruction should distinctly authorize the destruction of its nest, eggs, and young.

It will be difficult, doubtless, to enforce strictly a law which makes it a misdemeanor intentionally to feed or shelter the Sparrow, but some such law will be found necessary in order to prevent the systematic propagation of Sparrows in places where otherwise they might be completely extirpated, and it will serve also as a wholesome check on those individuals who do not believe the Sparrow to be injurious, and would be glad to frustrate any plan for its destruction.

The appointment of at least one person in each town or village, who shall act as a professional Sparrow-killer, in our opinion is one of the most imperative necessities of the case. Towns and cities are the nurseries of Sparrows, and will serve to replenish the surrounding country, no matter how industriously the farmer may shoot them.

From the nature of the case the use of fire-arms and poison in towns and cities must always be restricted to comparatively few individuals, whose discretion can be depended upon. Other persons can do much by the destruction of nests and eggs, or by the use of traps and nets, but the main work of exterminating the Sparrow inside the limits of a town must fall on persons specially designated for the work. That such persons, being already civil officers of some grade, should serve ordinarily without additional pay, is a suggestion which should commend itself; for otherwise there would be a natural tendency on the part of the incumbent to make the occupation permanent, while it would be to the obvious advantage of a non-salaried officer to accomplish the extermination of the Sparrow as quickly as possible.

Circumstances, however, must govern largely the appointment and compensation of such officers, and it is evident that in many places where Sparrows are very abundant they should be able to give their entire time to them, especially at first, and in such cases should be employed at a fixed salary, contingent, however, on the killing of a certain number of Sparrows per week or month, with perhaps a bonus for every additional hundred or thousand killed during a specified time.

As the Sparrows in a district decreased, the number required from any one man could be reduced, and the number of men employed might be lessened also, until finally the regular game constable, or other officer, would be able in addition to his other duties to keep down the Sparrows.

Aside from the numerical strength of the Sparrow, the principal obstacle to its extermination is to be looked for in the opposition of a small number of persons in each town who see no present necessity for destroying the Sparrows in their neighborhood, and can not appreciate the importance of simultaneous action over all the country.

It is hoped that the contents of the present volume will do much to lessen the number of people who take such a stand; and it is believed that many who now cherish the Sparrows would be perfectly willing to have them exterminated if they could be sure that any native birds would take their places. Except in absolutely treeless cities there is not the slightest doubt that this replacement by native birds can be effected if reasonable efforts are made; and it is most urgently recommended that, simultaneously with the efforts to exterminate the Sparrow, every possible care be taken to protect and foster our native birds, and induce them to return to our towns and cities and make their homes in our parks, shade trees, and gardens.

Wrens, bluebirds, swallows, and martins may be assisted very materially by closing up the openings of their boxes as soon as they leave them in the fall; re-opening them only on their return in the spring. In this way the Sparrow will be unable to appropriate the boxes during their absence, and if all other breeding places in the vicinity are secured against them very few will linger to dispute the boxes with the native birds when they come.

Boxes intended for the wren may be left open through the winter provided the entrance be made too small to admit a Sparrow.

In shooting Sparrows about parks or gardens at times when other birds are present, care should be taken not to alarm the latter, and this can be effected by using such weapons as are made especially for the use of bird collectors, since they make very little noise, and the small amount of powder and fine shot used prevents damage to buildings or trees. Moreover, such a weapon, while just as effective, is far more economical than a larger gun.

In winter it may be difficult to keep many native birds in our northern cities, yet there are species of woodpeckers, chickadees, nuthatches, kinglets, sparrows, and finches which remain in the Northern States in large numbers every winter, and need only a little food, and the assurance that they will not be molested, to bring them regularly about houses and gardens, even in towns and cities.

There is one plan for the extermination of Sparrows which might give good results under some conditions, and which might be tried on a small scale first and subsequently on a larger one if the results of the experiment should warrant it. A premium might be offered for the largest number of Sparrows killed in a given district within a specified time. For example, a township or county might make such an offer, prescribing the conditions, and requiring each contestant for the prize to comply with them. So far as possible such a contest should be open to every one residing in the district, but the utmost care should be taken to prevent the slaughter of other birds than Sparrows, and unless all participants had perfect confidence in each other, precautions should be taken to prevent the importation of dead Sparrows from neighboring places of greater abundance. Secondary prizes might be offered for the next largest numbers killed, and if the amounts were large enough very many people would be tempted to compete for them. It is certain that $500 or $1,000 expended in this way would result in the destruction of very many more Sparrows than if the same amount were paid out in bounties; and probably under ordinary circumstances this method would yield better results than any other plan of paid extermination. Similar plans, on a smaller scale, might be tried by farmers' clubs and similar organizations, and doubtless would destroy many Sparrows.

BOUNTIES.

INEXPEDIENCY OF BOUNTIES IN GENERAL.

It is not expedient to offer bounties for the destruction of Sparrows. In fact, at the present time it is desirable and perfectly feasible to bring about a great reduction in their ranks by concerted action of the people, aided by helpful legislation, without drawing heavily upon the public purse.

Bounties offered for the destruction of harmful species seldom accomplish the desired end, and if success does finally result, it is only after vastly larger expenditures than were at first thought necessary. After a harmful species—the wolf, for example—has become rather scarce in any section of country, the offer of a bounty may lead to its complete extermination; and to attain such a result it is certainly good economy to make the bounty large. Obviously, it is better to pay a large sum at once for the last few pairs of wolves in a district than to offer a bounty so small that it is little inducement to a hunter to spend his time in their pursuit. In this latter case the wolves easily hold their own for many years, or even increase slowly, while the aggregate bounties paid will far exceed all expectation. In order to be effective a bounty should be large enough to assure the destruction of the great majority of the individuals during the first year, and this is especially true of species which are very numerous and prolific. And yet the amount of money required for the payment of bounties in such cases would be so enormous as to make the plan impracticable.

ESTIMATED COST OF EXTERMINATING THE SPARROWS IN OHIO BY MEANS OF BOUNTIES.

A rough estimate of the amount of bounty money which would be required to exterminate the Sparrows in a single State may put this matter in a clearer light. Let Ohio serve as an illustration, and for the sake of argument let it be assumed that no Sparrows enter the State from outside after the payment of bounties begins. Ohio has an area of about 40,000 square miles, or 25,500,000 acres, and the entire State is thickly sprinkled with cities, towns, and villages, separated from each other only by populous and productive farm lands which constitute at least three-fourths of the total area of the State. In the larger cities Sparrows fairly swarm, and it is doubtful if they are entirely absent from a single village of a thousand inhabitants or upwards; moreover, the abundant evidence from Ohio shows that Sparrows are found on almost all the farms in the State, and in grain-growing sections their numbers are almost incredible.

Mr. Charles Dury, of Avondale, Ohio, says:

> In some localities the swarms of Sparrows are prodigious. One flock observed by me in October, 1887, near Ross Lake, had tens of thousands of birds in it. They rose in a cloud and settled down on a stubble-field, covering it all over.

It is scarcely possible to do more than guess at the number of Sparrows which the State of Ohio supports at present, but keeping in mind the points already mentioned and the fact that less than one-fiftieth of the entire area of the State consists of unimproved lands, it will be perfectly safe to say that Ohio contains at least 20,000,000 acres of good Sparrow country, and that, on an average, there are at least two Sparrows to the acre, which is 40,000,000 Sparrows for the whole State.

No doubt this estimate is far too low, but it is desirable to keep far within bounds in making estimates of this kind, and the above figures are sufficiently large for present purposes.

Supposing all these Sparrows could be killed before any further increase took place, they would still cost the State, at one cent apiece, $400,000. But it would be absolutely impossible to exterminate all the Sparrows in the course of a single year by any expenditure of money, and it is very improbable that so small a bounty as one cent apiece would effect any perceptible decrease in their numbers, if indeed it even neutralized the increase. Certainly not one-half the original 40,000,000 would be killed; for although at first fair wages might be made by killing them in places of greatest abundance, this could not be continued long, as the Sparrows are exceeding cunning and very quickly learn to avoid danger. As soon as Sparrows became so scarce or so shy that a person skilled in shooting or trapping could kill only 100 or less per day, the bounty of one cent would cease to be an inducement, and the few Sparrows killed by boys and others, who might still follow them up for sport, would be insignificant.

Meanwhile, the very means used to destroy them would serve to distribute the remainder more evenly through the country, and their rapid rate ot increase would more than counterbalance the losses caused by the bounty law. At the close of the year, therefore, the State would have paid out a large sum of money, and there would be just as many Sparrows as ever, and in all probability more.

But suppose that the bounty can be made large enough to insure the immediate destruction of a large proportion of the Sparrows. Let it be assumed that with 40,000,000 Sparrows as a starting point on January 1, so large a bounty is offered that during the next three months 20,000,000 Sparrows are killed. During this time no young will have been reared, so there will be but 20,000,000 Sparrows left.

If now left undisturbed, these birds would rear at least two broods of four or five young each during the next three months; that is 10,000,000 pairs would rear about 20,000,000 broods, aggregating upwards of 80,000,000 young. But in consequence of the bounty many will be killed before they rear any young, others will be able to rear but a single brood, while others still will succeed in rearing as many young as usual. In order not to overstate the increase let us assume the average number of young hatched during this quarter to be 4 for each pair of adults, but that two-fifths of the adults and one-half of all the young are killed for bounties during the quarter. Thus, starting with 20,000,000 Sparrows (10,000,000 pairs), before July 1, 40,000,000 young will be hatched, but 20,000,000 will be killed, together with 8,000,000 of the adults, so that, on July 1, there will remain 12,000,000 old birds and 20,000,000 young, or 32,000,000 in all.

By this time most of the old birds will have become very shy, but as the full grown young are much more abundant, as well as much less wary, the larger part of the Sparrows killed during the next three months will be young birds. Most of the adults, however, will succeed in rearing one more brood; but, allowing for the constant persecution to which they are subjected, and granting that one-third of the adults are killed during the quarter, these broods will hardly average more than 2 young to a pair. Thus, 6,000,000 pairs will hatch 12,000,000 young, 6,000,000 of which will be killed, together with 4,000,000 of the parents. It may be allowed also, in accordance with previous estimates, that one-half the young birds of the earlier broods are killed during this quarter; so that, on October 1, there would be left 8,000,000 adults, 6,000,000 young of the last brood, and 10,000,000 from the earlier broods, a total of 24,000,000; while bounties have been paid on 4,000,000 adults and 16,000,000 young, or on 20,000,000 in all.

During the next three months no increase will take place, but the decrease from bounties will be rather less than for any previous quarter, since the birds will have scattered to the country, and constant persecution will have made them very suspicious and difficult to kill. Perhaps, however, 40 per cent. will be killed and offered for bounties.

By summing up the results of the year's work it will be found that the number of Sparrows in Ohio has been reduced from 40,000,000 to about 14,500,000, *but at the expense of bounties paid on seventy-seven million six hundred thousand Sparrows.*

The opening of a second year finds the Sparrows reduced to about one-third of their original numbers, but this very paucity of numbers, joined to the experience acquired by the Sparrows during one year of zealous persecution, will make it a difficult matter to keep up the same rate of destruction during another year. However, by largely increasing the bounty it *might* be possible, and, provided the natural increase be estimated as heretofore, the end of the second year would find but 5,184,000 Sparrows left, although bounties would be paid during the year on nearly 25,000,000 Sparrows.

If now, by any increase of bounty, this rate of destruction could be maintained for the third year, about 10,000,000 more Sparrows would be killed and less than 2,000,000 would be left.

The fourth year at the same rate would reduce the surviving Sparrows to about 672,000 at the expense of a heavy bounty on more than 3,500,000, and the fifth year would result in the death of about 1,300,000, with a living remnant of 241,865 Sparrows.

The following table shows in detail the successive steps by which such a reduction would be made; the entire argument, however, resting on the assumption that as the number of Sparrows is lessened the bounty is increased, so that a fixed rate of reduction is maintained. Thus the bounty offered at the beginning of each year is assumed to be large enough to effect the destruction of more than five-sixths (84½ per cent.) of all the Sparrows (original plus increase) in the State during the year, so that the total number in the State at the beginning of any year will be but 36 per cent. of the number existing there at the beginning of the previous year.

Hypothetical table, showing in detail the probable effects upon the numbers of English Sparrows in Ohio, of a high and annually increased bounty during five successive years, under the most favorable circumstances.

Quarter.	Sparrows in the State at the beginning of each quarter.	Pairs breeding.	Young hatched.*	Adult Sparrows killed.†	Young killed.‡	Immature Sparrows killed in third quarter.§	Total number of Sparrows killed.	Percentage of Sparrows killed.
First year:								
Jan. to Mar	40, 000, 000			20, 000, 000			20, 000, 000	50
Apr. to June	20, 000, 000	10, 000, 000	40, 000, 000	8, 000, 000	20, 000, 000		28, 000, 000	46⅔
July to Sept	32, 000, 000	6, 000, 000	12, 000, 000	4, 000, 000	6, 000, 000	10, 000, 000	20, 000, 000	45½
Oct. to Dec	24, 000, 000			9, 600, 000			9, 600, 000	40
Total for year.							77, 600, 000	84 3/10
Second year:								
Jan. to Mar	14, 400, 000			7, 200, 000			7, 200, 000	50
Apr. to June	7, 200, 000	3, 600, 000	14, 400, 000	2, 880, 000	7, 200, 000		10, 080, 000	46⅔
July to Sept	11, 520, 000	2, 160, 000	4, 320, 000	1, 440, 000	2, 160, 000	3, 600, 000	7, 200, 000	45½
Oct. to Dec	8, 640, 000			3, 456, 000			3, 456, 000	40
Total for year.							27, 936, 000	84 3/10
Third year:								
Jan. to Mar	5, 184, 000			2, 592, 000			2, 592, 000	50
Apr. to June	2, 592, 000	1, 296, 000	5, 184, 000	1, 036, 800	2, 592, 000		3, 628, 800	46⅔
July to Sept	4, 147, 200	777, 600	1, 555, 200	518, 400	777, 600	1, 296, 000	2, 592, 000	45½
Oct. to Dec	3, 110, 400			1, 244, 160			1, 244, 160	40
Total for year.							10, 056, 960	84 3/10
Fourth year:								
Jan. to Mar	1, 866, 240			933, 120			933, 120	50
Apr. to June	933, 120	466, 560	1, 866, 240	373, 248	933, 120		1, 306, 368	46⅔
July to Sept	1, 492, 992	279, 936	559, 872	186, 622	279, 936	466, 560	933, 118	45½
Oct. to Dec	1, 119, 746			447, 898			447, 898	40
Total for year							3, 620, 504	84 3/10
Fifth year:								
Jan. to Mar	671, 848			335, 924			335, 924	50
Apr. to June	335, 924	167, 962	671, 848	134, 370	335, 924		470, 294	46⅔
July to Sept	537, 478	100, 777	201, 554	67, 185	100, 777	167, 962	335, 924	45½
Oct. to Dec	403, 108			161, 243			161, 243	40
Total for year.							1, 303, 385	84 3/10

Total number killed during five years, 120,516,849. Living remnant, 241,865.

* Equals four to each pair in second quarter; two to each pair in third quarter.
† Equals first quarter, 50 per cent.; second quarter, 40 per cent.; third quarter, 33⅓ per cent.
‡ Equals 50 per cent. each quarter.
§ Equals 50 per cent.

As to the cost of bounties during such a five years' war nothing better than rough estimates can be given, for it is impossible to know without trial how large a bounty would be necessary to secure the destruction of 50 per cent. of all the Sparrows in the State during the first three months. It is certain that one or even two cents apiece would not suffice, and it is doubtful if three cents apiece would secure this end. Possibly the necessary rate could be ascertained by experiment, and after this had been maintained for a year, and the Sparrows had decreased to about one-third of their previous numbers, other experiments could be made in order to determine the rate necessary to secure a continuance of the same ratio of decrease. It is but reasonable to suppose that if Sparrows are but one-third as plenty (and three times as shy!) as formerly it will be worth at least three times as much to kill them; but, allowing that it costs only twice as much to maintain the same rate of decrease, it will be very expensive, nevertheless, to continue this during four years.

The following table shows how costly such an undertaking would be, even were it certain that the lowest rate, one cent apiece for the first year, would secure the desired result. It is more than probable, however, that at least three cents apiece would be necessary to accomplish the first year's work, and after this had been doubled for the second year, it would be found inexpedient to continue so expensive an experiment.

Hypothetical table, showing the amount of money necessary to expend in bounties on English Sparrows in Ohio for five years, at the rates of 1, 2, 3, 4, *and* 5 *cents a Sparrow the first year, the rates being doubled each successive year.*

[Based on the conditions assumed in the last table, of which it is a corollary.]

Year.	Sparrows killed.	Rate.	Cost.
		Cents	
First	77, 600, 000	1	$776, 000. 00
Second	27, 936, 000	2	558, 720. 00
Third	10, 056, 960	4	402, 278. 40
Fourth	3, 620, 504	8	289, 640. 32
Fifth	1, 303, 385	16	208, 541. 60
Total	120, 516, 849	......	2, 235, 180. 32
First	77, 600, 000	2	1, 552, 000. 00
Second	27, 936, 000	4	1, 117, 440. 00
Third	10, 056, 960	8	804, 556. 80
Fourth	3, 620, 504	16	579, 280. 64
Fifth	1, 303, 385	32	417, 083. 20
Total	120, 516, 849	......	4, 470, 360. 64
First	77, 600, 000	3	2, 328, 000. 00
Second	27, 936, 000	6	1, 676, 160. 00
Third	10, 056, 960	12	1, 206, 835. 20
Fourth	3, 620, 504	24	868, 920. 96
Fifth	1, 303, 385	48	625, 624. 80
Total	120, 516, 849	......	6, 705, 540. 96
First	77, 600, 000	4	3, 104, 000. 00
Second	27, 936, 000	8	2, 234, 880. 00
Third	10, 056, 960	16	1, 609, 113. 60
Fourth	3, 620, 504	32	1, 158, 561. 28
Fifth	1, 303, 385	64	834, 166. 40
Total	120, 516, 849	......	8, 940, 721. 28
First	77, 600, 000	5	3, 880, 000. 00
Second	27, 936, 000	10	2, 793, 600. 00
Third	10, 056, 960	20	2, 011, 392. 00
Fourth	3, 620, 504	40	1, 448, 201. 60
Fifth	1, 303, 385	80	1, 042, 708. 00
Total	120, 516, 849	......	11, 175, 901. 60

When it is remembered that all the assumptions and estimates upon which these conclusions are based have been moderate in the extreme, and that all the conditions are supposed to have been favorable for the successful operation of the law, it will be seen how futile would be the attempt to exterminate the Sparrow in Ohio by the offer of bounties.

Some of the considerations which have not been brought into the calculation at all, but which of necessity must affect the question materially, are the following:

(1) The expense necessary, even at the moderate estimates submitted, would be greater than any State could afford.

(2) Such a scheme of extermination, to be successful, must be carefully planned, and must be carried on for at least five successive years. But in all probability the first year's expenditures would be so heavy, that an immediate repeal of the law would be demanded. Moreover, as no accurate census of the Sparrow population of the State could be made, it would be impossible to tell exactly what proportion of the Sparrows had been killed, and this element of uncertainty would be a powerful argument for repeal. Furthermore, the mere continuation of a fixed bounty would prove wholly inadequate, for, as already shown, it must be largely increased—probably doubled or trebled—each year in order to accomplish any tangible result. This can not be provided for in the original bill without in part frustrating the very design of the law; for if it is known that after January 1 of any year the bounty is to be increased, few people will care to hunt Sparrows during the last weeks or months of the preceding year.

(3) The number of Sparrows in the State might prove to be very much greater than was supposed.

(4) In spite of all checks the actual rate of increase might prove to be much greater than that assumed.

(5) Unless neighboring States should prosecute equally vigorous campaigns, Sparrows would enter the State in considerable numbers if the warfare were relaxed for a single month.

(6) Even admitting the possibility of reducing the Sparrows 50 per cent. during the first three months of a year, it is very doubtful if the rate of decrease assumed for the remainder of the year could be secured without an increase of bounty,

(7) As soon as Sparrows became somewhat scarce throughout the State, and the bounty was correspondingly increased, people would begin to protect and rear them simply for the sake of the bounty, and so long as the law did not *compel* a man to rid his land of them his intentional neglect would give the same result as intentional propagation.

(8) In spite of all precautions many Sparrows killed in States where they were still abundant would be sent into Ohio, and bounties would be collected for them; and this would be done the more frequently as their number became smaller and smaller in Ohio and the bounty was made larger and larger.

(9) In order properly and speedily to examine all applications for bounties, and to destroy all Sparrows or Sparrow heads on which bounties had been paid, it would be necessary to appoint one or more persons in each town or village, who should have the requisite knowledge, to attend to this matter. It would be useless to expect the town clerk or other town officer to assume this duty without additional compensation, and, moreover, very few such officers would be competent to discriminate between heads of English Sparrows and those of more valuable birds; hence,

(10) Either an additional expense would be put upon the State, or else

many valuable native birds would be destroyed and the State would pay bounties unwittingly on the heads of some of its best friends.

(11) It must be borne in mind that the money expended in bounties by no means represents the entire expense of a bounty law. To this sum must be added not only the cost of incidentals, such as fire-arms, ammunition, grain for baiting, poison, traps, nets, etc.—items often small in themselves, but amounting to considerable sums in the aggregate—but also the cost of advertising the bounty, examining and paying claims, and destroying heads.

It has been suggested that the bounty money, however great the amount, might be raised by taxation, and eventually would be returned to the very people who paid the taxes. But a moment's thought will convince any one that this argument is utterly fallacious. The taxes would be collected necessarily from all citizens, whether they sustained any injury from Sparrows or not, and yet not one citizen in one hundred would kill any Sparrows or receive any bounty, since few men could afford to neglect their business for the sake of securing a few dollars a week in bounties. Thus the bulk of the money would go to people having no regular occupation and little or no taxable property. In this way it is true the money would be kept in the State, and, provided all the Sparrows were killed, the State would reap the benefit, but the money itself would not return to those who contributed it.

The suggestion has been made that, as the bodies of all Sparrows killed by other means than poison might be utilized for food, a Sparrow-killer could collect the bounty on the head and realize an additional profit from the sale of the body; so that the bounty might be very small and prove effective nevertheless. But in many places there is absolutely no market for Sparrows at any price; and, if there were, it is doubtful if the heads alone would be sufficient for identification when presented for bounty to the proper officer.

Again, it is claimed by some that all destruction of Sparrows, caused by the offer of a bounty, would be additional to the destruction already going on without expense to the State; and it is further urged that the natural checks on the Sparrow's increase would lessen still further the number on which bounties could be paid. In regard to the first claim it need only be said that it is an assumption not only unsupported by any facts at all, but rendered improbable by all the evidence bearing on the question. There is every reason to believe that independent, unpaid persecution of the Sparrows would cease almost entirely as soon as a bounty law became operative.

The second claim may be conceded without argument, but in the foregoing estimates due allowance was made for the effects of natural checks by assuming at the outset an extremely low rate of increase.

To those who see thousands of Sparrows daily, perching familiarly on their window-sills or hopping unconcernedly about the streets, it seems an easy thing to kill them by scores or hundreds, and many people believe that any wide-awake boy could trap a thousand a day, and that any man who should give his entire time to the business could make a fortune at the rate of a cent apiece. It is useless to assure such persons that the Sparrow is watchful, suspicious, cunning, and quickly becomes so shy that it is one of the most difficult of all birds to kill; but ordinarily a single day's experience with trap or gun will convince even the most skeptical.

Another point to be considered in connection with the question of bounties is the desirability of a premium on the Sparrow's eggs.

That the destruction of the eggs is one of the most effective checks upon increase is unquestionable, but the practical difficulties which stand in the way of a bounty on eggs are so numerous as to make its trial a measure of doubtful utility. The discovery of an accessible nest makes it easy in most cases to kill the parent birds, but if there is a bounty on the eggs the juvenile Sparrow-hunter is tempted to take the eggs without disturbing the birds, well knowing that a week later he is almost certain to find another set of eggs in the same nest. By removing a part of the eggs at a time the bird may be induced sometimes to lay thirty or forty eggs in succession, and such a discovery is a veritable bonanza to an enterprising boy.

Charlie H. Shaw, of West Berlin, Ohio, states that in 1887 a neighbor took forty eggs in succession from one English Sparrow's nest; and Dr. Coues refers to the case of an English Sparrow which laid thirty-five eggs in as many days. Between April 22 and June 27 (1884) Eli W. Blake, 3d, of Providence, R. I., took nine hundred and fifty-three Sparrow's eggs from some fifty-five or sixty nests in the ivy on a church, and nine hundred and seventy eggs were taken *at one time* from the nests on another church in that city.

The eggs of the English Sparrow vary so much in size and markings, that it is impossible always to distinguish them from eggs of some of our native birds; hence a bounty on Sparrow's eggs might lead to the destruction of the eggs of many valuable birds, while it would be certain to encourage among boys a habit of nest-robbing, which would be likely to endure and extend to the nests of native birds after the Sparrows had become scarce.

The histories of two recent bounty laws in the United States possess more than ordinary interest as bearing directly on the questions discussed here.

MONTANA'S BOUNTY LAW ON PRAIRIE DOGS AND GROUND SQUIRRELS.

Early in 1887 the Territory of Montana offered a bounty of 10 cents each on prairie dogs and 5 cents each on ground squirrels. The act went into effect March 5, 1887, and the bounties paid during the next six months amounted to more than $50,000. On September 12, 1887, the record of payments stood as follows:

153,709 prairie dogs, at 10 cents each	$15,370.90
698,971 ground squirrels, at 5 cents each	34,948.55
Total	50,319.45

It is stated that up to this time the number of prairie dogs and ground squirrels killed had had no perceptible effect on their abundance in the Territory, and as the money in the treasury was exhausted, the Governor, with the permission of the President, called a special session of the legislature and the act was repealed.

MICHIGAN'S BOUNTY LAW ON ENGLISH SPARROWS.

In 1887 the State of Michigan offered a bounty of 1 cent apiece for English Sparrows in lots of not less than 25. (A copy of the act will be found on page 169 of this Bulletin.)

Any claim for this bounty must be submitted to the clerk of the township, village, or city in which the Sparrows were killed, and, if allowed, the clerk issues a certificate for the proper amount, payable by the county treasurer, from the contingent fund of the county. This act went into effect March 15, 1887, but for various reasons it does not appear to answer the purpose intended.

Unquestionably, the law itself is defective in some respects. Thus, in Wayne County, of which Detroit is the county seat, no bounties have been paid, owing to the fact that the county treasurer has "no authority to pay anything except on the warrant of the board of auditors," and the bounty act provides only for payment on certificates issued by the clerk of a township, village, or city. The act provides, furthermore, that the bounties shall be paid from the contingent fund of the county, and in some cases the county supervisors have failed to make any provision for such payment. The proviso that not less than 25 heads can be presented at once, and the necessity of going or sending to the county seat, are features which deter many persons from availing themselves of the act, but, even were all these obstacles removed, it seems probable that the offer of 1 cent a head would not be large enough to tempt many persons to engage in the business of killing Sparrows.

In reply to requests sent to the county treasurers throughout the State, reports have been received to date from forty-one counties. These reports cover a large part of the area in which Sparrows are most numerous, and may be taken, therefore, as a fair sample of the whole State; yet in twenty-two of these counties no Sparrows whatever have been presented for bounty. The largest number reported thus far from any one county is 1,638 from Kent County, between January 1, 1888, and March 30, 1888. The number on which bounties were paid in this county prior to January 1, 1888, is not reported, but on the above basis it would have been nearly 5,200, or about 6,800 Sparrows for the first year in which the law was operative. The reports from two other counties are similarly incomplete, giving returns for only a small part of the time, but by estimating as above, an approximation to the actual number has been obtained, and the total number of Sparrows killed, for bounties in these forty-one counties is about

15,500, or an average of 378 for a county. As there are eighty-two counties in Michigan, this gives 31,000 Sparrows, a number utterly insignificant, in fact not more than were actually trapped by a single enterprising man in Indianapolis, Ind., during the past two years. (See Report of W. T. Hill, page 181 of this Bulletin.

No data are at hand on which to base even an approximate estimate of the total number of Sparrows in the State of Michigan, but as there must be many millions at least, it is evident that the present bounty law not only fails to lessen the total at all, but probably does not effect the destruction of one per cent. of the annual increase. Doubtless the entire thirty-one thousand might have been killed within the city limits of Detroit without making any noticeable difference in the number of Sparrows in that city.

In this connection we desire to acknowledge the receipt of valuable information from the following county officers in Michigan:

Name and address.	County.	Name and address.	County.
S. J. McNally, treasurer, Harrisville	Alcona.	B. W. Wright, assistant treasurer, Marquette	Marquette.
Hein Lankheet, treasurer, Allegan	Allegan.	J. C. Gardner, treasurer, Big Rapids	Mecosta.
Albert S. Abbott, treasurer, Bellaire	Antrim.	Stod E. Drew, treasurer, Midland	Midland.
C. A. Hough, treasurer, Hastings	Barry.	Orville F. Mason, treasurer, Stanton	Montcalm.
W. J. Pettitt, treasurer, Benzonia	Benzie.	Martin Waalkes, treasurer, Muskegon	Muskegon.
Edmund B. Storms, treasurer, Berrien Springs	Berrien.	Hiram L. Brace, treasurer	Newaygo.
J. W. Wood, treasurer, Marshall	Calhoun.	J. Allen Bigelow, treasurer, Pontiac	Oakland.
J. E. Cueny, treasurer, Cheboygan	Cheboygan.	John F. Widoe, deputy treasurer, Hart	Oceana.
James H. Conn, treasurer, St. Johns	Clinton.	W. M. McCrassen, treasurer, West Branch	Ogemaw.
John Campbell, treasurer, Flint	Genesee.	J. F. Radcliffe, treasurer, Hersey	Osceola.
E. H. Foster, treasurer, Traverse City	Grand Traverse.	E. P. Gibbs, treasurer, Grand Haven	Ottawa.
William Brice, treasurer, Ithaca	Gratiot.	Hermann Hoeft, treasurer, Rogers City	Presque Isle.
James Beattie, treasurer, Hillsdale	Hillsdale.	William Burns, treasurer, Port Huron	Saint Clair.
William D. Longyear, treasurer, Mason	Ingham.	Chris. Murphy, treasurer, Sandusky	Sanilac.
J. Warren Peake, treasurer, Ionia	Ionia.	Geo. H. Orr, treasurer, Manistique	Schoolcraft.
B. Snow, treasurer, Kalamazoo	Kalamazoo.	G. D. Mason, deputy treasurer, Corunna	Shiawassee.
Charles D. Stebbins, treasurer, Grand Rapids	Kent.	Charles H. Butler, treasurer, Paw Paw	Van Buren.
Robert J. Matthews, treasurer, Baldwin	Lake.	Ralph Phelps, jr., treasurer, Detroit	Wayne.
Peter Stiver, treasurer, Lapeer	Lapeer.	Ezra Harger, treasurer, Cardillac	Wexford.
John J. Miller, deputy treasurer, Leland	Leelanaw.		
William C. Moran, treasurer, Adrian	Lenawee.		
Robert Johnson, treasurer, Manistee	Manistee.		

RECOMMENDATIONS TO THE PEOPLE.

GENERAL SUGGESTIONS.

The English Sparrow is a curse of such virulence that it ought to be systematically attacked and destroyed before it becomes necessary to deplete the public treasury for the purpose, as has been done in other countries. By concerted action, and by taking advantage of its gregarious habits, much good may be accomplished with little or no expenditure of money.

If the people can be led to appreciate the undeniable facts with regard to the Sparrow, the danger to be apprehended from its continued increase will soon be realized, and a vigorous campaign against the bird will follow. Too much assistance must not be expected from legislative action. Under ordinary circumstances the repeal of all unnecessary restrictions on Sparrow-killing and the legalization of all safe methods of extermination are all that can be demanded, and the rest must be accomplished by the intelligent, persistent, united efforts of the people.

USE OF FIRE-ARMS, TRAPS, AND POISON.

The Sparrow is a cunning, wary bird, and soon learns to avoid the means devised by man for its destruction. Hence much sagacity must be displayed in the warfare against it. In the winter-time, if food is placed in some convenient spot at the same hour each day for a week, the Sparrows will gather in dense flocks to feed, and large numbers may be killed at one time by firing upon them with small shot. By spreading the food along a narrow strip of ground which can be raked conveniently from some hiding-place, the best results may be obtained. When shooting Sparrows which are collected in flocks, especially in and about grain fields, an ordinary gun, heavily loaded with small shot, should be used, but for regular work on single birds, about houses, and particularly in cities and towns, a different weapon is desirable. Almost any "collecting gun" of small caliber will be convenient, and very small charges in a 22-caliber shell are perfectly effective at short range.

Such charges do not frighten the remaining Sparrows badly, and do not alarm other birds. Moreover, the cost of ammunition is comparatively small. Probably the most effective weapon is what is known as an "auxiliary barrel," *i. e.*, a small-caliber barrel from six to eight inches long, which can be slipped inside the barrel of an ordinary breech-loading shot-gun. Such a barrel using No. 22 shells, which are exploded and ejected precisely like the larger ones, is not only almost as noiseless and economical as the regular collecting guns, but is effective at greater distances and permits greater accuracy of aim. Such a weapon, in proper hands, may be freely used even in the streets and parks of a large city without damage to anything except Sparrows.

Sometimes Sparrows may be successfully netted or trapped, but this requires considerable skill, and except under favorable conditions at night, one must be content to catch them singly, or at most in twos or threes. They are so suspicious, and learn so quickly from experience, that it is almost impossible to catch many in succession at the same place and by the same means. Much valuable information on this subject will be found in Mr. Hill's report in another part of this volume.

Sparrows may be poisoned by grain soaked in solutions of arsenic or strychnine, or by meal mixed with the poison in powder, but poisoning is attended with some danger and should be attempted only by official Sparrow-killers. Full directions for the preparation and administration of poisoned food will be found in the chapter on this subject by Dr. A. K. Fisher. (See page 174).

DESTRUCTION OF NESTS AND DISTURBANCE AT ROOSTING PLACES.

Large numbers may be destroyed and increase prevented by the systematic destruction of their nests, eggs, and young. By the aid of an iron rod and hook, set in the end of a long pole, most of their nests can be reached and brought down. This method promises most satisfactory results.

They may be easily driven from their roosting places by disturbing them on several successive nights. A very efficacious method is to throw water upon them when at roost. In cities where hose-pipe is available the process is simple and certain. They may be kept out of ornamental vines in the same manner, particularly in the breeding season, when a thorough soaking not only disconcerts the old birds and kills their young, but at the same time does much good by wetting the vines and washing out their filth.

If a part of the birds are shot or caught each time they are disturbed at their roosting places, the remainder are much less likely to return.

In every town will be found a few persons unwilling to co-operate in efforts to exterminate Sparrows; but if such persons continue to harbor them about their own houses when they are driven away from most other places about the town, the Sparrows will probably become so numerous and offensive eventually that their defenders will be forced in self-defense to take some steps against them. Or it may be possible, by municipal authority, to compel such persons either to drive the Sparrows away or to permit others to do so.

It is important to prevent Sparrows from establishing themselves in new places throughout the country, and if the first comers are killed or frightened away it will be comparatively easy to do this, unless they are allowed to increase without check in the surrounding country or towns.

Therefore, farmers everywhere should be on the lookout for Sparrows and should not allow a single new pair to nest on their farms, while every possible means should be tried to reduce the numbers in the adjoining towns and villages.

SPARROW CLUBS AND SHOOTING MATCHES.

In many parts of Europe, where a constant warfare is waged against this bird, clubs are formed for the purpose of killing Sparrows. In some cases each member of such a club is bound to present to the secretary the heads of a certain number of Sparrows each year or to pay a fine, and the fines thus collected (sometimes augmented by voluntary contributions) are used as bounties or prizes for the members killing the most Sparrows. The following item, clipped from a recent paper, shows the interest now taken in Sparrows by the people of Stratford-upon-Avon, an English town of less than 8,000 inhabitants:

> The honorary secretary of the Stratford-upon-Avon Sparrow Club, reports that during the past year [1887] over 19,000 birds have been killed. The club pays 3*d*. per dozen for heads of all Sparrows destroyed, and over £23 has been paid in this way during the year. The common Sparrow is held to be destructive to farmers' crops, and the club was formed for the purpose of keeping down the number of these birds. About 20,000 a year is the average number destroyed in the neighborhood of Stratford-upon-Avon.

Similar clubs have been formed in some parts of the United States, and if every agricultural or horticultural society, or farmer's club, would adopt some such plan of concerted action against the Sparrow a vast amount of good might be accomplished. Even without any cash prizes such clubs would accomplish something, while an occasional revival of the old-time shooting match, in which the day's hunt should be devoted exclusively to Sparrows, would yield a large amount of sport and materially lessen the Sparrows in the district. In one such hunt in Wadsworth, Ohio, recently, twenty-six men took part, and 980 Sparrows were killed.

THE SPARROW AS AN ARTICLE OF FOOD.

In this connection it should not be forgotton that the English Sparrow is an excellent article of food, equaling many of the smaller game birds. In fact, at restaurants it is commonly sold under the name of "Rice-bird," even at times of the year when there are no Rice-birds in the country.

When the Sparrow has been feeding on grain fields or in the wild rice marshes its flesh is especially good, and if caught alive in the city the quality of the flesh can be much improved by feeding it for a few days with oatmeal, corn-meal, or wheat.

(See also in this connection pages 38 and 39.)

SECTION THIRD.—LEGISLATION AFFECTING THE ENGLISH SPARROW IN THE UNITED STATES.

In order to obtain trustworthy information as to all legislation affecting the Sparrow in the United States, a letter was sent in the fall of 1887 to the Secretary of State of each State and Territory of the Union, asking for copies of all laws in force in that State relating to game, to birds or mammals, and especially to the English Sparrow. To date, replies have been received from a majority of the States and Territories, most of the secretaries sending the desired documents or giving references to the volumes in which they could be found. In cases where no response was made, recourse was had to the latest revised statutes on file in the libraries, but it is feared that in this way some of the latest acts have escaped notice. By combining the information received from all sources, however, the following epitome of legislation affecting the Sparrow has been compiled, and may be assumed to be measurably complete, except for such changes as may have occurred within the last few months.

It should be noted that the appearance in this place of any law which merely mentions "sparrows," "song-birds," "insectivorous birds," "undomesticated birds," and the like, must not be construed as evidence that we believe such law to affect the English Sparrow; such points must be determined by the courts, and the attempt made here is simply to show what laws *may* have a bearing on the case. A brief discussion of these laws will be found in a previous section under the head of recommendations for legislation. (See page 150.)

LAWS AFFECTING THE ENGLISH SPARROW.

Alabama.—No law bearing on the question.

Alaska.—No law bearing on the question.

Arizona.—No law bearing on the question.

Arkansas.—It shall be unlawful to destroy, disturb, or rob, the nests of any wild birds whatsoever, except those of crows, blackbirds, hawks, owls, eagles, and birds of prey. * * * Any person violating any of the provisions of this act shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be fined in any sum * * * not less than three dollars, nor more than ten, for each nest of eggs destroyed as aforesaid, together with the costs of prosecution. (Act of February 23, 1885, sections 3 and 6.)

California.—No law bearing on the question.

Colorado.—No person shall kill, ensnare, net, or trap, within this State, any * * * sparrow * * * or other insectivorous birds. * * * Any person who shall violate any of the provisions of the first section of this act shall be guilty of a misdemeanor, and upon conviction thereof shall be fined in a sum not less than five dollars, nor more than fifty dollars, with costs of suit, and shall be prosecuted and punished in the same manner as in other cases of misdemeanor. One-half of the fine in such cases shall be paid to the person informing against such offender, and the other half to the treasurer of the county in which the offense was committed, and become a part of the school fund. * * * (Laws, chap. XLV, sections 1 and 2.)

Connecticut.—Every person who shall kill, cage, or trap any * * * sparrow * * * between the first days of February and September in any year, shall forfeit one dollar for each bird so killed, caged, or trapped, to him who shall sue therefor. (G. S., 1875, 229, section 4.)

Dakota.—No law bearing on the question.

Delaware.—If any person within either of the counties of this State shall kill, take, or destroy, upon lands not owned by himself, any of the following birds, viz: * * * sparrow * * * or other insectivorous bird, or shall willfully take or destroy the eggs or nest of any of the aforesaid birds, such person shall be deemed guilty of a common nuisance, and, upon conviction thereof before any justice of the peace in this State, shall be fined one dollar for each bird so killed, taken, or destroyed, or for each nest of birds'-eggs take nor destroyed as aforesaid; and every person having such bird in his possession shall be deemed to have taken, killed, or destroyed the same in violation of the provisions of this section, unless the contrary be proved; and if such person shall fail or refuse to pay such fine and all costs immediately, the said justice shall forthwith commit him to the custody of the sheriff until the same are paid; one-half of said fine for the use of the State, and the other half for the informer.

If any person or persons shall enter upon any lands not owned by himself, with gun and dog, or with gun alone, for the purpose of shooting any kind of birds or game, without first obtaining permission to do so by the owner or occupant, he shall forfeit and pay a fine of five dollars. * * * (Laws of 1874, chapter 55, sections 15, 16.)

District of Columbia.—No person shall kill or expose for sale, or have in his or her possession dead, at any time any * * * sparrow * * * or any other insectivorous bird, save as herein provided, under a penalty of two dollars for each bird killed or in possession dead. (Act of June 15, 1878.)

Florida.—No law bearing on the question.

Georgia.—No law bearing on the question.

Idaho.—No law bearing on the question.

Illinois.—No person shall at any time within this State kill, or attempt to trap, net, ensnare, destroy or kill, any * * * sparrow * * * nor rob or destroy the nests of such birds or either or any of them. And any person so offending shall, on conviction, be fined the sum of five dollars for each and every bird so killed, and for each and every nest robbed or destroyed: *Provided*, That nothing in this section shall be construed to prevent the owner or occupant of lands from destroying any of the birds herein named on the same, when deemed necessary for the protection of fruits or property. (Revised Statutes, 1874, chapter 61, section 3.)

Indiana.—Whoever kills or injures, or pursues with intent to do so, any * * * sparrow * * * or wantonly destroys or disturbs the eggs of any such birds, shall be fined not more than ten dollars nor less than one dollar. (Revised Statutes, 1881, section 2108.)

Indian Territory.—No law bearing on the question.

Iowa.—If any person kill, trap, ensnare, or in any manner destroy, any of the birds of this State, excepting birds of prey, the migratory aquatic birds, and those which are useful for food, and the killing of which at certain seasons of the year is now permitted by law, or in any manner destroy the eggs of such birds as are hereby intended to be protected from destruction, he shall be deemed guilty of a misdemeanor, and, on conviction thereof, shall be fined not less than five nor more than twenty-five dollars. * * * (Statutes, 1880, section 4063.)

Kansas.—It shall be unlawful for any person or persons at any time, excepting as hereinafter provided, to catch, kill, trap, shoot, or ensnare, or to pursue with such intent, any wild bird except the wild goose, duck, hawk, excepting the harrier, crow, bluejay, snipe, curlew, plover, piper, bittern, heron, crane, and woodpecker. * * * Any person found guilty of violation of any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof before a justice of the peace shall be fined in a sum not less than five nor more than twenty-five dollars for each and every offense, and costs, together with attorney's fee of ten dollars, and shall be committed until paid. * * * (Laws of 1885, chapter 45, sections 1 and 5.)

Kentucky.—That no person shall at any time catch, kill, or pursue with such intent or have in possession after the same has been caught or killed, any * * * sparrow * * * or other song or insectivorous bird, except where the same shall be destructive to the fruit or grain crops, under a penalty of three dollars for each offense.

That no person shall rob or destroy the nests or eggs of any wild bird whatsoever, save only those of a predatory nature and destructive of game or insectivorous birds, under a penalty of five dollars for each offense. (Act of March 11, 1876, sections 9, 10.)

Louisiana.—No person shall catch, kill, or pursue with such intent, or have in possession after the same has been caught or killed, any * * * sparrow * * * except when the same shall be destructive to the fruit or grain crop, under a penalty of not less than five nor more than twenty-five dollars for each offense.

No person shall rob or destroy the nest or eggs of any wild bird whatsoever, save only those of a predatory nature, and destructive of game or insectivorous birds, under a penalty of not less than five nor more than twenty-five dollars for each offense. (Laws of 1877.)

Maine.—Whoever kills or has in his possession, except alive, any birds, commonly known as * * * sparrows * * * or other insectivorous birds, crows and hawks excepted, forfeits not less than one dollar, nor more than five dollars, for each such bird killed, and the possession by any person of such dead bird is prima facie evidence that he killed such bird.

Whoever at any time wantonly takes or destroys the nest, eggs, or unfledged young of any wild bird, except crows, hawks, and owls, or takes any eggs or young from such nests, except for the purpose of preserving the same as specimens, or of rearing said young alive, forfeits not less than one dollar nor more than ten dollars for each nest, egg, or young so taken or destroyed. (Revised Statutes, chapter 30, sections 23, 24.)

Maryland.—No law bearing on the question.

Massachusetts.—Whoever takes or kills any wild or undomesticated bird * * * except English Sparrows * * * or willfully destroys, disturbs, or takes a nest or eggs of any wild or undomesticated birds, except of the birds herein exempt from protection, shall be punished by a fine of ten dollars. (Laws of 1886, chapter 276, section 4.)

Michigan.—An act to authorize the killing of "English Sparrows." (Act No. 4, Public Acts of 1885, p. 4.)

SEC. 1. The people of the State of Michigan enact, That it shall be lawful to kill the birds commonly called "English Sparrows."

SEC. 2. All acts heretofore passed, contrary to the provisions of the preceding section, are hereby repealed.

This act is ordered to take immediate effect.

Approved February 17, 1885.

AN ACT to provide for the payment of bounties for the killing of English Sparrows. (Act No. 29, Laws of 1887, p. 29.)

SEC. 1. The people of the State of Michigan enact, That every person, being an inhabitant of this State, who shall kill an English Sparrow, in any organized township, village, or city in this State, shall be entitled to receive a bounty of one cent for each Sparrow thus killed, to be allowed and paid in the manner hereinafter provided.

SEC. 2. Every person applying for such bounty shall take such Sparrow, or the head thereof, in lots of not less than twenty-five, to the clerk of the township, village, or city within which such Sparrow shall have been killed, who shall thereupon decide upon such application, and if satisfied of the correctness of such claim, shall issue a certificate stating the amount of bounty to which such applicant is entitled, and deliver the same to said applicant, and shall destroy the heads of such Sparrows.

SEC. 3. Such certificate may be presented by the claimant or his agent to the county treasurer of the county in which such Sparrow or Sparrows may have been killed, who shall pay the same out of the contingent fund of said county.

This act is ordered to take immediate effect.

Approved March 15, 1887.

Minnesota.—No law bearing on the question.

Mississippi.—If any person shall at any time * * * destroy or rob the nest of any wild bird whatever, except crows, blackbirds, bluejays, hawks, owls, and other birds of prey * * * or shall have in his possession, or shall sell or buy, or offer or expose for sale, or receive for transportation or carriage, or on deposit, or for sale, or for any other purpose, any of the eggs of any wild bird, except those above excepted * * * he shall on conviction be fined not more than one dollar for each egg, and not more than three dollars for each fowl or bird * * * one-half of which on recovery shall be paid to the informer * * * (Revised Code, 1880, chapter 29, section 955.)

Missouri.—It shall be unlawful for any person to catch, kill or injure, or attempt to catch, kill or injure any wild song bird, or any * * * insectivorous bird at any season of the year * * * and it shall be unlawful for any person at any time or season to disturb, rob or destroy any wild bird's nest, or take therefrom any egg or eggs of any wild bird whatsoever.

The provisions of section one shall not apply to any person who shall kill any bird on his own premises in the act of destroying fruits, grapes, or honey-bees * * *

Any person who shall violate any of the provisions of this act, shall, upon conviction, be adjudged guilty of a misdemeanor, and punished by fine not exceeding twenty dollars for each and every animal and bird caught, killed or injured. * * * (Act of April 11, 1877, sections 1, 2, and 5.)

Montana.—Any person who shall willfully shoot, or otherwise kill or in any manner whatever cause to be killed, any robin * * * or any other of the small birds known as singing birds, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than five nor more than ten dollars for each offense committed.

Any person who shall willfully destroy the nests or carry away the eggs from the nests of any of the birds or wild fowl mentioned in this act, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than five dollars, nor more than ten dollars for each offense committed. (Act of March 8, 1883, sections 7 and 8.)

Nebraska.—It shall be unlawful for any person in the State of Nebraska to knowingly and intentionally kill, injure or harm, except upon the lands owned by such person, any * * * sparrow * * * or other bird or birds of like nature, that promote agriculture and horticulture by feeding on noxious worms and insects, or that are attractive in appearance or cheerful in song. Any person violating any of the provisions of this section shall be fined not less than three nor more than ten dollars for each bird killed, injured or harmed. (Compiled Statutes, 1884, chapter 11, section 83.)

Nevada.—It shall be unlawful for any person or persons at any time to kill or injure, or to pursue with such intent, any * * * sparrow * * * or to disturb the nest or eggs of said bird.

It shall be unlawful for any person or persons within this State at any time to * * * destroy, injure or disturb the nest or eggs of any of the birds protected by this act.

Every person or persons offending against any of the provisions of this act shall be deemed guilty of a misdemeanor, and on conviction thereof shall be fined in any sum not less than twenty-five dollars, nor more than two hundred dollars, or imprisoned in the county jail of the county in which said conviction is had, for any term not exceeding six months, or by both such fine and imprisonment, and the prosecuting witness shall be entitled to receive a fee equal to one-half of the amount of any such fine imposed on each conviction. (Laws of 1885, chapter 788, sections 1, 3, 7.)

New Hampshire.—If any person shall, at any season of the year, take, kill, or destroy any of the birds called * * * sparrows * * * or any other of the song birds or insectivorous birds, he shall be punished by a fine of five dollars for each and every such bird so taken, killed, or destroyed, or by imprisonment not exceeding thirty days, or both. * * * *

If any person shall designedly take from the nest and destroy the eggs or young of any of the birds called * * * sparrows * * * he shall forfeit and pay, for every egg or young of any of said birds so taken and destroyed, the sum of two dollars, to the use of the prosecutor. (Game Laws, 1886, chapter 2, sections 1, 5.)

New Jersey.—A further supplement to an act entitled "An act to amend and consolidate the several acts relating to game and game fish, approved March 27, 1874, and the supplement thereto, approved March 8, 1877.

SECTION 1. That nothing in the act to which this is a supplement shall hereafter be construed as applying to the English Sparrow, and that all said English Sparrows shall be excluded from any protection whatever.

SEC. 2. That all acts and parts of acts inconsistent with the provisions of this act be, and the same are hereby, repealed.

Approved March 9, 1885.

(Supplement to Revision of Statutes of New Jersey, 1887, p. 315.)

New Mexico.—No law bearing on the question.

New York.—Laws of 1886, chapter 427.

SECTION 1. No person in any of the counties of this State, shall kill, wound, trap, net, snare, catch with bird lime, or with any similar substance, poison or drug, any * * * wild bird, other than a game bird. * * *

SEC. 2. No person shall take or needlessly destroy the nest or eggs of any song or wild bird.

SEC. 6. The English or European House Sparrow (*Passer domesticus*) is not included among the birds protected by this act, and it shall be considered a misdemeanor to intentionally give food or shelter to the same. * * * (As amended by chapter 641, laws of 1887.)

SEC. 7. Any person or persons violating any of the provisions of this act shall be deemed guilty of a misdemeanor, punishable by imprisonment in the county jail or penitentiary, of not less than five nor more than thirty days, or to a fine of not less than ten or more than fifty dollars, or both, at the discretion of the court.

SEC. 8. In all actions for the recovery of penalties under this act, one-half of the recovery shall belong to the plaintiff, and the remainder shall be paid to the county treasurer of the county where the offense is committed, except if the offense be committed in the city and county of New York, the remaining one-half shall be paid to the chamberlain of said city.

SEC. 9. All acts or parts of acts inconsistent with, or contrary to the provisions of this act, are hereby repealed.

SEC. 10. This act shall take effect immediately.

North Carolina.—No law bearing on the question.

Ohio.—Whoever, at any time, catches, kills or injures, or pursues with such intent, any swan, sparrow, other than English Sparrow, robin * * * or disturbs or destroys the eggs of any such birds, shall be fined not more than fifty, nor less than two dollars, or imprisoned not more than thirty days, or both. (Revised Statutes, 1884, section 6960, as amended by act of April 19, 1883.)

AN ACT to provide for the payment of Bounties for the killing of English Sparrows.

SECTION 1. *Be it enacted by the General Assembly of the State of Ohio,* That every person, being an inhabitant of this State, shall be entitled to receive a bounty of ten cents per dozen for all sparrows, known as the English Sparrow, killed ; to be allowed and paid in the manner hereinafter provided.

SEC. 2. Every person applying for such bounty, shall take such sparrow or the head thereof in lots of not less than 25 to the clerk of the township, village or city, within which such sparrow shall have been killed, who shall thereupon decide upon such application, and if satisfied of the correctness of such claim, shall issue a certificate stating the amount of bounty such applicant is entitled [to], and deliver the same to such applicant, and shall destroy the heads of such sparrows.

SEC. 3. Such certificate may be presented by the claimant or his agent, to the city treasurer, or the treasurer of the township in which such sparrows may have been killed, who shall pay the same out of the township fund of said township.

SEC. 4. This act shall take effect and be in force from and after its passage.

Passed March 30, 1888.

Oregon.—No law bearing on the question.

Pennsylvania.—An act to permit the killing at any season of the year of the small bird known as the English Sparrow.

SECTION 1. *Be it enacted, &c.*, That from and after the passage of this act, it shall be lawful, at any season of the year, to kill or in any way destroy the small bird commonly known as the English Sparrow.

SEC. 2. All acts or parts of acts inconsistent herewith are hereby repealed.

Approved the 4th day of June, A. D. 1883.

Rhode Island.—Public laws passed at the January session, 1887, chapter 642. An act in amendment of chapter 94 of the public statutes, "Of Birds."

It is enacted by the General Assembly as follows :

SEC. 1. Section 5 of chapter 94 of the public statutes is hereby amended so as to read as follows :

"SEC. 5. All * * * English Sparrows * * * may be killed, taken or destroyed at any time of year."

SEC. 2. This act shall take effect immediately.

South Carolina.—It shall not be lawful for any person in this State to wantonly shoot, or entrap for the purpose of killing, or in any other manner destroy any bird whose principal food is insects, or take or destroy the eggs or young of any of the species or varieties of birds represented by the several families of bats * * * and all other species and varieties of land birds, whether great or small, of every description, regarded as harmless in their habits, and whose flesh is unfit for food, including the turkey buzzard * * * and any person violating the provisions of this section shall on conviction thereof forfeit and pay a fine of ten dollars, which fine, if imposed, shall go one-half to the informer, and the other half thereof to the use of the county in which the offense was committed: Provided, That no person shall be prevented from protecting any crop of fruit or grain on his own lands from the depredations of any birds herein intended to be protected. (Laws of 1882, section 1695.)

Tennessee.—[No single act affords general protection to the English Sparrow in Tennessee, but there are several sections of the State code which relate to sparrows and other birds in certain counties and groups of counties, of which the following are specimens :]

SEC. 2223. No person shall hunt, capture, or kill any * * * bird that feeds on insects which destroy fruit trees, as the sparrow * * * in Robertson, Davidson, Lincoln, Maury, and Shelby Counties, from the first day of February to the first day of September. * * *

SEC. 2224. No person shall at any time destroy the nests or eggs of any of said birds in any of the counties named in the last section.

SEC. 2225. Any person violating sections 2223, 2224 may be prosecuted therefor before any justice of the county ; and upon conviction fined * * * five dollars for every * * * of the above-named birds killed, and the same for every bird's nest robbed and destroyed. * * * (1884.)

Texas.—If any person shall willfully kill, or in any manner injure, any * * * sparrow * * * he shall be deemed guilty of a misdemeanor, and, upon conviction before a justice of the peace, or other court of competent jurisdiction, he shall be fined a sum of not less than five nor more than fifteen dollars.

(General laws of 1883; amendment of art. 429 of penal code. Amendments to subsequent articles of the code exempt a large number of counties from the operation of the law quoted.)

Utah.—No law bearing on the question.

Vermont.—A person who intentionally shoots or otherwise wounds, kills or destroys, entraps, ensnares, or captures a * * * sparrow * * * or destroys the nest or eggs of any of said birds, shall forfeit ten dollars, which may be recovered in an action of debt, with costs, by any person who sues for the same. (Revised laws of Vermont, sec. 3896.)

Virginia.—No law bearing on the question.

Washington Terr.—No law bearing on the question.

West Virginia.—It shall be unlawful for any person at any time to catch, kill, or injure, or to pursue with such intent, any * * * sparrow * * *.

And it shall be unlawful for any person to destroy or disturb the eggs of any of the birds protected by this chapter; and any person offending against any of the foregoing provisions of this chapter shall be fined in any sum not less than two dollars nor more than twenty-five dollars for each offense on conviction in the proper court, or be imprisoned in the county jail not more than twenty days, or both, at the discretion of the court, and pay the costs of prosecution.

It shall be unlawful for any person to purchase or offer for sale any of the birds or game mentioned in this chapter, caught or killed during the time when such catching, killing, or destroying is made unlawful hereby. Any person offending against the provisions of this section shall be liable to the same penalty as is provided in this chapter for catching, killing, or destroying such birds or game. (Amended Code, 1884, chapter 62, sections 10, 12, 14.)

Wisconsin.—That any person who shall shoot, kill, or catch by means or use of any net, snare, trap, gin, or spring-gun any * * * sparrow * * * for millinery purposes shall be deemed to be guilty of a misdemeanor, and upon conviction thereof in any court of competent jurisdiction within this State shall be punished by the payment of a fine not exceeding the sum of one hundred dollars nor less than five dollars for each offense, to be collected as provided by the laws of this State for the collection of fines. One-half of such fine when collected shall be paid to the county treasurer, and by him paid into the school fund; the remaining half shall be paid to the informer. (Laws of 1887, chapter 413.)

Wyoming.—No law bearing on the question.

SECTION FOURTH

DESTRUCTION OF THE SPARROW BY POISONS.

By Dr. A. K. FISHER, *Assistant Ornithologist.*

From time to time numerous letters of inquiry have been received by the Department asking for detailed instructions in regard to the destruction of English Sparrows by poisons. So few reliable facts could be procured on the subject that it was found necessary to conduct a series of experiments in order to obtain the desired information. It was important to determine not only what poison is most efficient and best adapted for the purpose, but also the most economical poison, the quantity necessary for use, and the simplest practicable method of preparation. With these objects in view a large number of healthy English Sparrows were secured and confined in large cages. They were given an abundance of food and water during the time covered by the experiments, so that they might not be forced from hunger to partake of the poisoned grain.

THE POISONS USED IN EXPERIMENTS AND THE FORMULÆ FOR THEIR PREPARATION.

The following poisons were used in the experiments: Strychnine; arsenic; corrosive sublimate.

Of strychnine, two preparations were used: Crystals of strychnine; tincture of nux vomica.

Of arsenic the following preparations were used: Arsenious oxide (white arsenic); arsenite of copper (Paris green); arsenite of calcium (London purple); arseniate of soda; liq. potassii arsenitis (Fowler's solution).

The results of these experiments have led to the recommendation of the following formulæ as simple, efficacious, and inexpensive:

ARSENIC.—One part by weight of *white arsenic* to fifteen parts of corn-meal or grain. Paris green and London purple would be just as valuable as white arsenic except for their bright color, which arouses the Sparrow's suspicions.

Directions: If *corn-meal* is used, the arsenic should be stirred in dry, and the mixture afterward moistened. It should be fed moist. If *whole grain* is used, it should be moistened before stirring in the arsenic. It will be found advantageous to add a little gum arabic to the water used to moisten the grain, as it causes the poison to adhere more firmly to the kernels. It should be dried before using. Wheat is preferable to all other grain, because the Sparrows feed upon it more eagerly.

STRYCHNINE.—Dissolve 2 grams of strychnine in a liter of hot water. Ordinarily, strychnine is put up in bottles containing $\frac{1}{8}$ ounce. Half of the contents of one of these bottles, dissolved in a quart of hot water, gives a solution of the desired strength.

Directions: To insure the best results it is necessary to soak the grain in the poison solution at least forty-eight hours. It should then be dried. Grain prepared in this way may be kept in jars, to be used as required.

Corrosive sublimate, *cyanide of potassium*, *phosphorus*, and a number of other poisons, although efficient, can not be recommended on account of the danger attending their use.

COST OF POISONED GRAIN.

Arsenic costs about seven or eight cents per pound and four pounds will poison a bushel of wheat (60 pounds), so that a bushel of arsenic-poisoned wheat would cost from a dollar to a dollar and a quarter, according to the price of wheat, and corn-meal poisoned in like manner would cost about the same. This amount of poison, however, is much larger than most persons would need to use, and probably would be sufficient to kill more than twenty-five thousand Sparrows.

Strychnine is much more expensive than arsenic, but ordinarily an ounce of strychnine should not cost more than $2. An ounce of strychnine dissolved in four gallons of water suffices to poison a bushel of wheat, which will cost, therefore, from $2.75 to $3, according to the price of wheat.

An ounce of average winter wheat contains about seven hundred kernels. A quart (30 ounces) contains about twenty-one thousand kernels. A bushel (60 pounds) contains about six hundred and seventy-two thousand kernels. Six or seven kernels poisoned as above would be amply sufficient to kill a Sparrow, and hence a bushel of strychnine-poisoned wheat is enough to kill one hundred thousand Sparrows.

GENERAL SUGGESTIONS.

In dealing with as suspicious a bird as the English Sparrow, in cases where the continued use of the poison is required, a slow poison (such as arsenic) is preferable to one of rapid action (such as strychnine), for the reason that the effects of the latter may become apparent in certain individuals while the birds are still feeding, the peculiar actions of the affected birds frightening the others away before they have taken enough of the poisoned grain to insure fatal results. In such cases it has been observed that the frightened birds never return to the grain.

Before putting out poison for Sparrows, the birds should be baited to a certain locality. At the same hour each day they should be fed with the same kind of grain that subsequently is to be used as the vehicle for the poison.

PRECAUTIONS.

In the use of poisons the utmost caution is necessary to prevent the possibility of accident from the poison itself or from the grain employed as a vehicle for the poison. The following precautions should be observed: (1) All vessels containing poison or poisoned grain, and those in which the same are mixed, should be labeled with the word *poison* in large letters; (2) all vessels containing poison or poisoned grain should be kept out of reach of children and domesticated animals; (3) in preparing and exposing poisoned grain, great care should be taken to avoid spilling any of it where it might be found by children, farm animals, or poultry.

Another possible source of danger in the use of poisons, and one that is much less easy to guard against, arises from the fact that the bodies of the poisoned birds are liable to fall where they may be picked up and eaten by man or beast. However, very little real danger is to be apprehended from this source.

SYNOPSIS OF EXPERIMENTS.

Following is a brief synopsis of the experiments in poisoning made by the Division:

EXPERIMENTS WITH STRYCHNINE.

No. 1 (1 bird).—Fed on wheat, soaked one and one-half hours in a solution of strychnine (.65 of a gram to 30 c. c. of cold water) and dried. Bird commenced eating at 1.16 p. m. At 1.27 p. m. showed first symptoms. At 3.10 p. m. it had apparently nearly recovered. Next morning it was dead. Stomach and crop contained 9 kernels of wheat.

No. 2 (1 bird).—Fed on hemp seed soaked twenty-four hours in a solution of strychnine (.325 of a gram to 30 c. c. of cold water) and dried. Bird commenced eating at 11.35 a. m.; died at 12.20. Crop contained 3 shelled hemp seed; stomach none.

No. 3 (3 birds).—Fed on hemp seed soaked twenty-four hours in a solution of strychnine (.65 of a gram to 30 c. c. of cold water) and dried. Commenced feeding at 12.15 (it is impossible to say that all three commenced at that time). Bird No. 1 died at 12.42. Crop contained 3 shelled hemp seeds; none in stomach. Bird No. 2, at about 1 o'clock, showed first symptoms while eating; at 3.10, however, it had partially recovered. It was dead the next morning. Stomach and crop contained 4–5 kernels. Bird No. 3 ate the poisoned hemp seed and non-poisoned wheat until 3.10 p. m., seemingly without bad results. It was dead next morning. Three kernels of hemp seed were all that could be discovered in the stomach and crop, which contained also 10–12 kernels of non-poisoned wheat.

No. 4 (2 birds).—Fed on wheat soaked forty-five hours in a solution of strychnine (.325 of a gram to 30 c.c. of cold water) and dried. Commenced eating at 10.20; both dead at 11.05. Each had eaten 3 kernels of wheat.

No. 5 (1 bird).—Fed same as above. Commenced eating at 12.30, died at 1.14 p. m. Stomach contained wheat partially digested; nothing in crop.

No. 6 (1 bird).—Fed on oats soaked twenty hours in a solution of strychnine (.65 of a gram to 30 c. c. of cold water) and not dried. Bird commenced eating about 11 o'clock, but seemed not to relish the food. At 11.20 the bird was unsteady in its movements, but at 3.45 it was in good condition. Next morning had wholly recovered; probably did not eat enough of the poisoned grain.

No. 7 (2 birds).—Fed on non-poisoned hemp seed and wheat, and given water to drink containing .325 of a gram of sulphate strychnine to 30 c. c. of water. Four hours afterward they were visited and both were found dead and cold.

No. 8 (5 birds).—Fed on wheat soaked for forty-eight hours in a solution of strychnine (.16 of a gram to 30 c. c. water). Commenced eating at 11.15 a. m. At 1.45 p. m. two were dead. At 2 p. m. the third was dead. At 3 p. m. the fourth was dead. The last was found dead the next morning.

No. 9 (2 birds).—Fed on wheat soaked for forty-eight hours in solution of strychnine (.065 of a gram to 30 c. c. of water). Commenced eating at 10 a. m. First bird died at 10.45. Its stomach and crop contained 10 kernels of wheat. At 11.10 the second bird died. Its crop contained 4 kernels; stomach empty.

No. 10 (5 birds).—Fed on wheat soaked forty-eight hours in solution of strychnine (.03 of a gram to 30 c. c. water). Commenced eating at 1 p. m. At 2 p. m. the first bird was dead and another badly affected, but recovered. Two were dead next morning. The fifth bird was not affected; probably did not eat enough. This solution would seem to be too weak to give certain results.

EXPERIMENT WITH TINCTURE OF NUX VOMICA.

No. 11 (3 birds).—Fed on wheat soaked twenty-four hours in tincture of nux vomica and dried. At 10.30 a. m. one bird eating; at 10.55 affected; at 1.15 p. m. symptoms passing off; recovered. At 1.15 p. m. second bird dead; stomach contained 8 kernels of wheat; crop empty. Another bird commencing to eat at 11 a. m. died at 1.10 p. m; stomach contained 4 kernels of wheat; crop none.

EXPERIMENT WITH CORROSIVE CHLORIDE OF MERCURY (CORROSIVE SUBLIMATE).

No. 12 (2 birds).—Fed on wheat soaked twenty-four hours in a saturated solution (in water) of corrosive sublimate and dried. Birds commenced to eat at 10.30 a. m. First bird died at 1.15 p. m.; stomach and crop empty. Second bird died at 3 p. m.; 2 kernels of wheat in stomach; crop empty.

EXPERIMENTS WITH WHITE ARSENIC.

No. 13 (1 bird).—Fed on Indian meal and white arsenic (15 to 1) mixed with a little water Commenced to eat immediately (9.45 a. m.). At 3.45 p. m. bird still in good spirits. Dead next morning; stomach and crop empty.

No. 14 (1 bird).—Fed same as No. 13. Commenced to eat at 9.30 a. m.; badly affected at 2 p. m.; dead at 2.54 p. m. Stomach and crop empty.

No. 15 (3 birds).—Fed same as Nos. 13 and 14. Commenced to eat at 8.45 a. m. At 3 p. m. two affected, and one seemed in good spirits. All were dead next morning. Stomachs and crops empty.

No. 16 (2 birds).—Fed on Indian meal and white arsenic (15 to 2), and moistened. Commenced to eat at 10.30 a. m. First bird died at 3 p. m.; stomach and crop empty. Second bird affected at 3.20; dead next morning.

EXPERIMENTS WITH ARSENIATE OF SODA.

No. 17 (1 bird).—Fed on hemp-seed soaked one and one-half hours in a solution of arseniate of soda (1.56 grams to 30 c. c. water) and dried. The bird ate freely, but recovered.

No. 18 (1 bird).—Fed on hemp-seed soaked one and one-half hours in a solution of arseniate of soda (2.10 grams to 30 c. c. water) and dried. Dead (time not taken). Stomach and crop contained 12 hemp-seed.

No. 19 (2 birds).—Fed on wheat soaked in a solution of arseniate of soda (2.10 grams to 30 c. c. water) three hours and dried. Commenced to eat at 9.30 a. m. First bird dead at 10.35 a. m.; crop empty; stomach contained 4 kernels. Second bird dead at 2.35 p. m.; crop and stomach empty.

EXPERIMENT WITH LIQUOR POTASSI ARSENITIS (FOWLER'S SOLUTION).

No. 20 (2 birds).—Fed on wheat soaked for seventy-two hours in Fowler's solution of arsenic (liquor potassi arsenitis). Commenced eating at 10 a. m.; lively at 4 p. m.; both dead next morning.

EXPERIMENTS WITH ARSENITE OF CALCIUM (LONDON PURPLE).

No. 21 (1 bird).—One hungry bird exposed to ground hemp-seed and London purple (15 to 1) for five hours, but would not touch it on account of its marked color.

NOTE.—When mixed with whole grain the color is not so conspicuous (see next experiment).

No. 22 (3 birds).—Fed on wheat and London purple (15 to 1) stirred up with a little gum-arabic water and then dried. Commenced eating at 9.45 a. m. First one dead at 3.30 p. m.; stomach and crop empty. Second and third badly affected at 3.30 p. m.; dead next morning; stomach and crop empty.

EXPERIMENTS WITH ARSENITE OF COPPER (PARIS GREEN).

No. 23 (3 birds).—Three hungry birds exposed to ground hemp-seed and Paris green for four hours, and refused to eat it on account of its bright color.

No. 24 (3 birds).—Fed on wheat and Paris green (15 to 1) stirred up with a little gum-arabic water and then dried. Commenced to eat at 9.45 a. m. First bird dead at 3.30 p. m.; stomach and crop empty. Second and third birds badly affected at 3.30 p. m.; dead next morning; stomachs and crops empty.

SECTION FIFTH.

THE TRAPPING OF SPARROWS FOR SPORTING PURPOSES.

By W. T. HILL.

HISTORY AND DETAILS OF THE BUSINESS.

Previous to April of this year (1887), I did not make an exclusive business of furnishing Sparrows for trap purposes, and kept no detailed account of the business done. Therefore it will be impossible to give other than approximate numbers taken and shipped, but for present purposes this will not matter. The number taken daily or monthly depends upon the season; the average number per day for one man would be about 100, the largest number taken in one day being 366.

I have sent Sparrows to a number of places in Indiana, Ohio, and Illinois. The farthest I have sent them north was to Hudson, Wis.; west, to Kearney, Nebr.; east, to Orange Valley, N. J.; and south, to Saint Louis, Mo. I have also sent them to several points in Iowa, the largest shipment made (1,500) being to Burlington, and I have sent them into the States of New York, Pennsylvania, Maryland, West Virginia, and Michigan, but to no point so far as I know where Sparrows were not already established.

My first shipment of Sparrows for sporting purposes consisted of two lots of two hundred each to Springfield, Ohio, and two lots, one of one hundred and fifty and one of six hundred and fifty, to Saint Louis, Mo., in the fall of 1885, which is less than two years ago, and Sparrows were very plentiful at both places then.

The first Sparrows in Indianapolis were two pairs sent to a gentleman by Richie Brothers, of New York, as a curiosity, which accidentally escaped from the cage. About the same time (1872) several hundred were procured and released by private individuals. Soon after this, when they had become somewhat numerous, it is reported that train men would close the doors of empty grain cars, into which the Sparrows had entered, carry them to a distance on the road, and then release them.

In 1874–'75 I caught a few (all together perhaps three hundred and fifty) for propagation elsewhere. Of these I have no data, for they were either disposed of through the medium of the bird-store, or those getting them of me either took them or sent them away themselves.

Apart from this I do not think I am in anyway responsible for the distribution of the Sparrow, and from the scores sent me by those who have used them for trap shooting I find about seventy per cent. are killed; therefore the escaping birds have added, as it were, but a "drop in the bucket" to the number already there.

From observations made in catching them I believe that at the time when the propagation of the Sparrow was so strongly advocated, they were taken by enthusiasts in small numbers to this and that place, and by being unmolested, through the protection of stringent laws, they increased in numbers rapidly; their range, in consequence of their nomadic, gregarious habits, becoming wider each successive year, until in many instances the birds from different points have met.

This feature of their "spreading" I find to be especially true of the young birds in the summer and fall, and it also applies to the mature birds in early spring at the approach of the season of nidification. After every available place is monopolized in cities and towns many retire to the remote suburbs, or even to the country, following the habitations of man and the works of civilization.

It is at this season of the year, perhaps, when those who object to the Sparrow can the most effectively keep them away, precisely as the Sparrow keeps the native birds away by monopolizing, prior to their arrival, such places as would be suitable to them in the work of nidification. The Sparrow, with its established maternal cares, protects these nesting places, and the native bird, having less at stake when it first appears, is naturally enough caused to go further on.

My father-in-law, living about eight miles from the city, upon the first appearance of the Sparrow in the spring, at once gets his rifle, and keeps it handy for about a month or more; also in the fall, with the young birds he uses his shot-gun, and by "nipping them in the bud" in this way he suffers no inconvenience or material loss.

The Sparrow, while it appears brave, is nevertheless extremely cautious and mistrustful, and whenever it displays any apparent assurance it has first learned by cautious approaches that there is no danger. I live in the suburbs of the city, and close by is a wheat field of some 50 acres, of which the Sparrows "took possession" last year, and for about two rounds of the machine next the fence it was scarcely worth the cutting. After it was cut the top-sheafs of some of the shocks were in some cases completely ransacked. The renter of the field kindly left me an open cleared place on a knoll in one corner, and in six consecutive days I caught 1,240 Sparrows, and they were still sufficiently plentiful to make it an object for me to catch them there. I advised this renter, if he sowed wheat the following year, to watch the first approach of the

Sparrows to the field at the time the grain began to ripen, and told him that, by keeping vigilance for a few mornings, with the aid of a shotgun they could be caused to turn their attention elsewhere. This was done, and the consequence was that he suffered no perceptible loss, nor did they harbor there in sufficient numbers this season to justify me in trying to catch them. This may have been partly due, however, to the fact that the grain ripened very rapidly, and there were several other wheat-fields within a mile of this one which ripened earlier; yet this particular field was the nearest to the city, and therefore the first for the birds to reach. Yet about the same conditions existed the previous year, and it is my firm opinion that the birds were driven away by this timely interruption.

The buildings of the stock-yards here cover several acres. Above the alleys running in the center of each shed, the roof, in the form of a ventilator, is several feet higher than the sheds proper, and at the point where the rafters end on each side is a casing, which forms a cavity between the rafters about nine inches high, eighteen inches long, and one foot deep, with the front (facing the pens) open. As all the sheds are built alike, there are necessarily thousands of these cavities, which seem to precisely suit the Sparrow to build its nest in. A few years ago they were so numerous there as to be considered a nuisance, both dangerous and dirty, and the employés were often detailed to tear out their nests and destroy all the eggs and young birds possible. But this afforded little relief, as the birds seemed capable of building them up again about as fast as they could be torn out. During last winter I made a net suitable to catch them out of the buildings at night; consequently at the beginning of the breeding season (the first of April) I commenced operations, and continued until the beginning of June. I went, in all, sixteen evenings, and succeeded in taking one thousand three hundred and sixty-four breeding birds (often finding eggs on the floor or shelves of the bird-house after they were put in). These were not all the birds there, and some few may have gone there after I stopped netting, but with what I caught and frightened away the number there this summer has been so strikingly less as to cause no trouble or alarm.

There is an old grave-yard within the city limits which the young birds heretofore have made their principal sleeping-place, and for an hour or two in the evening they would form one dense, continuous line approaching it. I obtained permission from the sexton to catch them there at night, but I commenced too soon, for after going there three times they left, and have not as yet returned. It was so well suited to their requirements that I scarcely expected their desertion of the place, for they have frequented it for years, and I have noticed their droppings under many of the trees so thick as to completely cover the ground.

I have mentioned these few things to show in part a peculiar characteristic of the bird which comes directly under my notice in my efforts to catch it; and if possible to show how the same characteristic may be taken advantage of in the interest of agriculture. While I deem the extermination of the Sparrow practically impossible, still I hold that it can be in a measure suppressed and its devastating pilfering prevented, if the nature of the bird is understood and such efforts are made at the proper time.

There are still a few who think the Sparrows do a greater proportion of good than harm, and I am refused the privilege of catching them on their premises. Some object to the destruction of the Sparrow from the stand-point of religion or humanity, and some (mostly unmarried ladies) because they have become attached to them as pets by feeding them regularly through the winter, and "don't like to see the poor little things hurt." In my judgment all efforts at extermination would be futile unless such efforts were simultaneous and universal, as well as persistent and continuous; otherwise the result would be only to drive them from a place of molestation to one of security.

I have been more or less devoted to bird-catching the whole of my life, and I must say that I have found the Sparrow, considering its numbers, to be the most difficult of all birds to catch. No bird has baffled and puzzled me in its movements as has the Sparrow. In keeping with my previous remarks I will say here that to be successful one must use the utmost care. On one occasion a Sparrow after being caught escaped from the net just as I was about to reach it. It remained near me, and on the approach of other birds, by cries of alarm, or by flying with them and leading them away, it succeeded in keeping almost every bird from the net. I could not frighten it away, but was interrupted by it in this way for upwards of an hour, when some one passed with a gun and I had them shoot it, after which I proceeded as usual.

The net usually used at night is upon two poles, the tops of which are bent over and hinged at the points.

After the birds are caught they very readily adapt themselves to the conditions of confinement, yet never become reconciled to it. Their principal food is feed-meal (corn) and wheat. They are put into a building designed especially for them, capable of holding several thousand, which is provided with innumerable ledges, slats, and perches, which are portable. In caging the birds for shipment, all openings to the house are closed, and perches removed, when the birds are driven to one end into and through a chute, the narrow end of which enters the door of a cage, in which they are temporarily inclosed until counted. The loss by death, in keeping them, has been about three per cent., and I have had them on hand, on an average, about three weeks.

There are very perceptibly fewer birds in and around the city now than there were a few years ago, especially in my immediate field of operation. I have taken, since the time I first commenced, over 40,000 birds, and have perhaps driven many times as many away; besides which there has been a very general warfare upon them by others, which my efforts seem to have stimulated somewhat. I have been watched while at work with no little attention by all classes of people, receiving one universal expression, in substance, "I wish you'd catch 'em all; they are a darned nuisance."

There is no merchantable value on Sparrows here as an article of food, but whatever birds are killed at a match are always taken by some one for this purpose. The flesh of the young bird is very edible, and in some parts of England they are sold by poulterers for one shilling a dozen, and by many are considered a delicacy.

As far as the application of the Sparrow to sporting purposes is concerned, I do not think its admirable adaptability can be overdrawn. The only tangible objection that can be advanced is that its size makes it hard to hit. Sparrow trap-shooting is not a new thing, but has been practiced in England for a great many years, in the era of muzzle-loading, "scatter" guns. Charles Dickens makes mention of it in one of his works. To-day, with breech-loading, hammerless, close patterned guns, the Sparrow, with its grit and cunning, tenacity of life, and prompt and vigorous flight, affords the sportsman a target involving the highest type of marksmanship, which many are learning to appreciate.

Everywhere I have sent Sparrows (with but one exception, when the birds were grossly neglected, and were in a dying condition when used) they have given the greatest possible satisfaction. While my efforts at introducing them have been attended with considerable expense and labor, still it has demonstrated the fact that they can be caught in sufficient numbers for trap-shooting, and that there will be a growing demand for them, provided they can be obtained under more favorable circumstances, and at less price. In many instances, when obtained from me, the transportation has entered so largely into their ultimate cost that they have been even more expensive than pigeons procured at home, after deducting the amount obtainable for the dead birds. Besides, there has been a slight dissatisfaction as to their price from the fact that the average shooter hasn't even the remotest idea of the manner in which they are caught, and seems to think I have some secret way of scooping them up by the thousand, which I won't divulge, and that in buying of me he is patronizing a monopoly that is virtually robbing him.

I have frequently received letters of inquiry asking (sometimes, perhaps, from idle curiosity) how I catch them, and the same question has been repeatedly asked in the various sporting papers. But it would be impossible for me to convey an adequate idea in detail in a single letter, even if I had time to devote to every one that desired it. I have endeavored to do so, however, but so far as I know no one has succeeded. In all probability the system is more extensive than they had supposed, and they have refrained from entering into it without a better understanding of it. But it is all easily understood and learned. Many of the features and appliances embodied in my arrangements are of my own origination and are constructed with a view to simplicity and convenience, and at the same time are so perfect that the mechanical operation of the nets is within the bounds of a child's comprehension. My little boy, nine years old, displays remarkable judgment in their manipulation. I have several outfits, and it has frequently been necessary for me to engage inexperienced persons to operate them. They learn at once, and always succeed in catching a number of birds, the measure of success depending upon individual intuition and dexterity. Of course a great deal depends upon a knowledge of the habits of the bird, and the when and where to go to catch them; and while there are some given rules for this, still in most part it is perplexing even to an expert, and experience alone can teach it.

The nets and other appliances used in trapping Sparrows are figured and fully described in the accompanying paper.

ENGLISH SPARROW CATCHING.*

DESCRIPTION OF APPARATUS AND METHODS EMPLOYED.

If we wish to catch a bird we must first acquaint ourselves with its nature and habits, that we may intelligently bring to bear upon it the proper means to insure success. Many birds, at certain seasons of the year, are readily caught with simple devices carelessly applied, but the English Sparrow, at all times, is the same cunning, wary little fellow, not to be caught with chaff alone, and great care is necessary in any approach upon it. Considering, however, that we have a vantage ground in its gregarious, nomadic habits, and following in this direction, we produce something that appeals directly to its extreme greediness and curiosity, which shall be life-like and real; and, realizing that it is quick to take alarm, we so apply it as to cause the bird to act impulsively, and to enable us to take it by surprise as much as possible.

The method used so successfully and almost exclusively by me requires nets, with decoy and braced birds, placed in the line of flight of the birds to and from their sleeping and feeding places. The wild birds are influenced by the decoy birds and then directed into the nets by means of the braced birds, and are invariably caught while on the wing or in the act of settling. The nets can also be used to great advantage in places where the birds are known to harbor, in which case decoy birds are not necessary; but there should be no building, tree, or other object for the bird to alight upon inside of 50 yards from the nets, it being best to attract its attention while on the wing, as well as to prevent it from discerning anything unusual. The skillful operation of the nets, in the main, consists in properly judging the flight of the bird in connection with the movements of the nets, and to so control the force of pulling in closing them as to cause the net to strike the bird when the radius of the semicircle of either wing is at a vertical point. The irregularity of the flight of the Sparrow makes it difficult to catch many at one time.

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* This article, by Mr. Hill, taken from the *American Field* of January 14, 1888, is substituted here for the description of apparatus and methods which accompanied his original contribution of September 30, 1887.

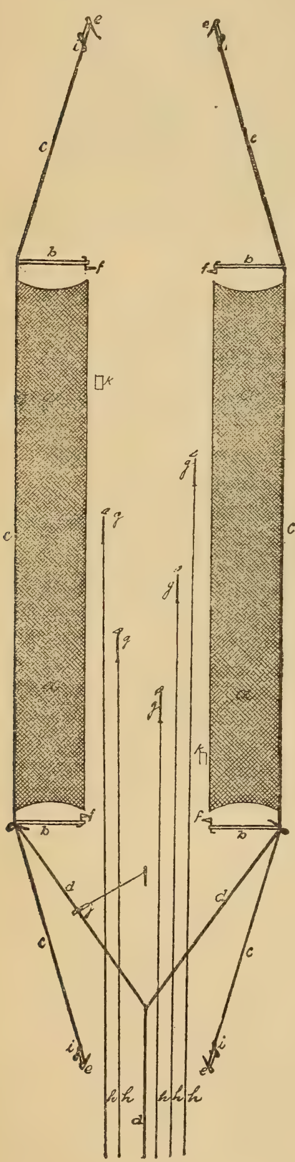

FIG. I.

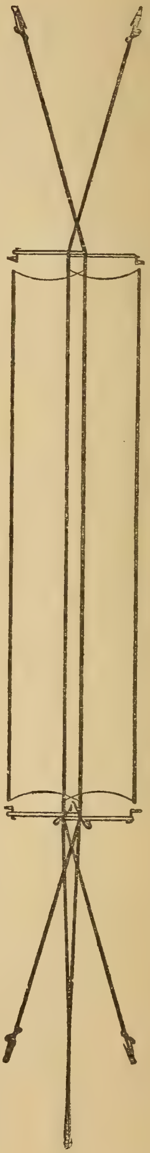

FIG. II.

The mechanical operation of these nets is shown in Figs. I and II. Fig. I shows nets open, lying flat upon the ground. By pulling pull-line (*d*) each net is caused to move upward and inward to the completion of a half circle, one net slightly overlapping the other when closed, as shown in Fig. II. The four points of each net formed by the two cheeks (*f*) and two heel-pins (*e*) are on a straight line. The nets are stretched tight over tops of staffs (*b*) which have socket attachment and work on wire in cheek as a pivot or hinge. The tension on pull-line will keep the nets straight and even, except when a strong wind blows across them, in which case the arm of pull-line is shortened or a pulley (*j*) attached.

A DESCRIPTION OF THE PARTS.

The nets should be made of linen material, about the size of No. 35 gilling-thread, of a dark, dirty-green color, the size of mesh being thirteen-sixteenths of an inch from knot to knot, or 15 knots to a foot. A convenient and serviceable size of net would be 30 feet long by 7 feet deep, to use with 4 foot staffs. They should be provided with an arming of heavier cord at the top and bottom edges, which the top-line (*c*, Fig. I) should be threaded through at top, and to form a stout edging to permit of pegging to the ground at bottom.

The top-line of net should be a fine linen cord, about one-eighth of an inch thick, provided at ends with a small wooden clamp (*i*, Fig. I) similar to those used upon tents; and at the place where the net ends on the top line, one or more loops or eyes should be spliced, to admit the button on top of staff, and also to fasten the arms of pull-line into.

The pull-line should be of same material as top-line, with diverging arms at end next the net. It should be about 40 yards long, which is the average distance to stand from the middle of net while operating it. A round piece of wood, about 4 inches long, is temporarily fastened to it to permit of taking a good grip in pulling.

The staffs should be about 4 feet long and three-quarters of an inch in diameter, of some light, strong wood, with brass socket and eye (*a*, Fig. III) at bottom, and button and ridge (*b*, Fig. III), also of brass, at top.

The cheeks (*a*, Fig. IV) are wedge-shaped stakes averaging 9 inches long, with wire (No. 10) driven in about an inch from top, which at a projection of an inch is bent upward for about an inch. They should be made of hickory or other hard wood, and the wire should fit in the wood so snugly as to barely permit of being moved with the fingers.

The heel-pins (*b*, Fig. IV) should also be made of hard wood, about 18 inches long, and 1 inch in diameter at thickest part, tapering to a point, with projection at top to prevent cord from slipping off.

The crooks (*c*, Fig. IV), which are used for staking the bottom edge of net to the ground, are cut from the branches of some hard wood tree, the long end being about 6 inches in length.

The bobber (1, Fig. V), which is used in connection with fly-stick for raising and flying braced bird, is constructed as follows: *a* is a piece of hard wood 2½ inches long, half an inch thick, and five-eighths of an inch wide; *b* is a piece of No. 10 wire that when bent so as to form an eye at top is 9 inches long, and passes through *a*, leaving a space of half an inch between wires, in which the fly-stick moves up and down; *c* is also of No. 10 wire, bent as shown, passing through *a* horizontally outside of perpendicular wire *b*; the ends being pointed and bent downward, are forced into the ground, together with the long ends of *b*, which keeps

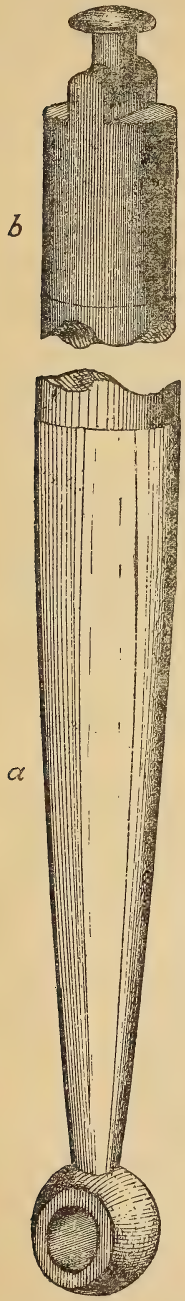

Fig. iii.

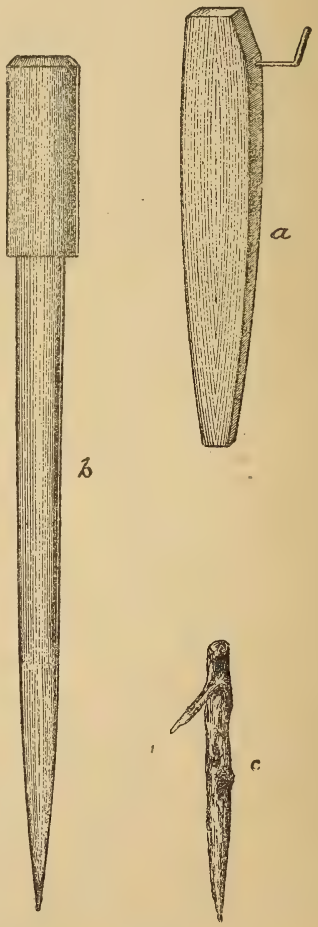

Fig. iv.

it firmly in position; *d* is also a piece of wood pivoted on wire *c*, with tapering hole in end, into which the fly-stick is inserted. The wires should fit snugly in *a*, so as to permit only of being moved to suit the conditions of hard and soft ground, and to regulate the height of raising bird; *d* should work more easily on wire *c* yet not loosely. To raise fly-stick pass brace-line through eye in top of wire *b*, and fasten to stick.

The fly-stick (2, Fig. V) to which the braced-bird is attached, and on which it is caused to sit, is a stiff willow switch about 2 feet long, with loop about 4½ inches long, made of fishing-line, wrapped on the small end by means of waxed thread.

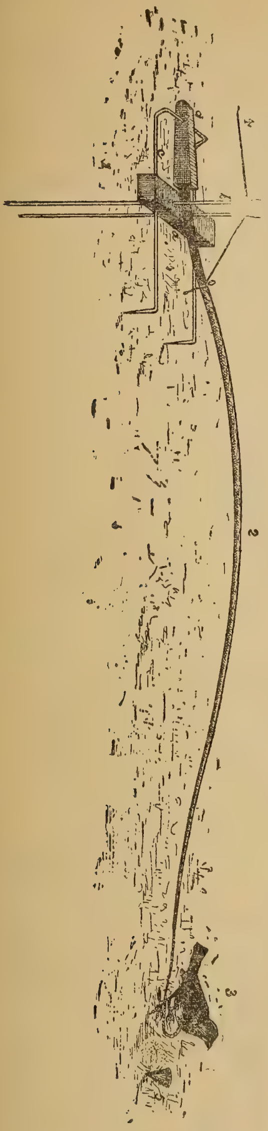

FIG. V.—The above cut represents braced bird, and appliances for using it; 1, bobber; 2, fly-stick; 3, braced bird; 4, brace-line; 5, water-cup.

The brace (Fig. VI) is composed of four cords and swivel, to be placed upon bird as a means of fastening it without injury, and to leave every movement of the bird free and natural. The ring should be of German silver wire, formed over a lead pencil, a common pin completing the swivel. The cord should be of soft cotton, which when stretched in a straight line should measure about 1¾ inches. To put it on the bird pass it over its head so as to appear like two cords encircling its body with swivel at breast bone, and the knot of cords in center of the back, when it will only be necessary to put each wing and leg of the bird (in the order named) between the cords on each side of brace.

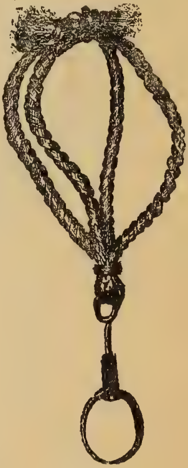

FIG. VI.

The brace-lines should be of mattress twine, 50 yards long, and wound upon reel to prevent twisting.

Blind cages are also necessary to receive the birds after they are caught. Each consists of a light frame of wood about 1 foot square by 5 inches high, covered with cloth; a stocking leg at top, in the middle, forming the door. These, together with a receptacle for carrying them, called a pack (Fig. VII), which is a light rigid frame, also covered with cloth (the nets and other appliances being rolled up on top), and a small hatchet, a sickle, and a camp-stool, complete the outfit.

HOW TO SET THE NETS.

Having described each part separately, we will now consider how to put them together. Taking for granted that the place which we have selected to put the nets down on is perfectly level and clean, and that the end of the pull line will reach a fence or other slight cover, the pack is placed upon the ground in the middle of the place where the nets are to be set, and the nets are laid in a line on each side of it. We now take two staffs and, lapping them about 9 inches, lay them on the ground at ends of top lines of nets, nearest where we intend to stand Taking the hatchet we drive two heel-pins in at the extremes of the staffs, when the distance between the two pins will be the length of both staffs, less the 9 inches we lapped them. Having taken each top line and allowed about a foot of slack by means of clamps, and placed them over heel pins, taking also an extra turn, we go to the other end and taking with us two more heel-pins repeat what we have just done, taking care that the lines are stretched perfectly straight and tight, and that these pins, upon which so much strain comes, are secure. The top lines of nets now form two straight, parallel lines, and care should be taken not to move them in any way until after the cheeks are driven in. These should now be driven in at the points along top line where the eyes appear at ends of nets, inclining slightly outward so that the wire will project on outside of line sufficiently to cause the net when stretched on staff and held perpendicularly to have a tendency to fall inwards. We now pass the socket of staffs over wires in the cheeks, and let out sufficient of the slack of top lines to permit of their being stretched over and attached to button on top of staffs. This being done we proceed to stake down the bottom edges of nets—first the four corners, and then the hollow places between them. The bobbers and fly-sticks come next, and if five are used they should be placed as shown

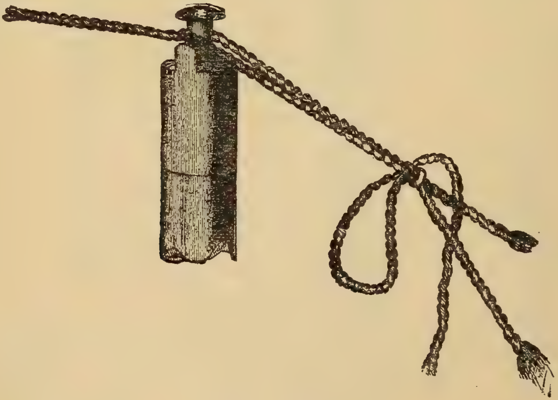

FIG. VIII.

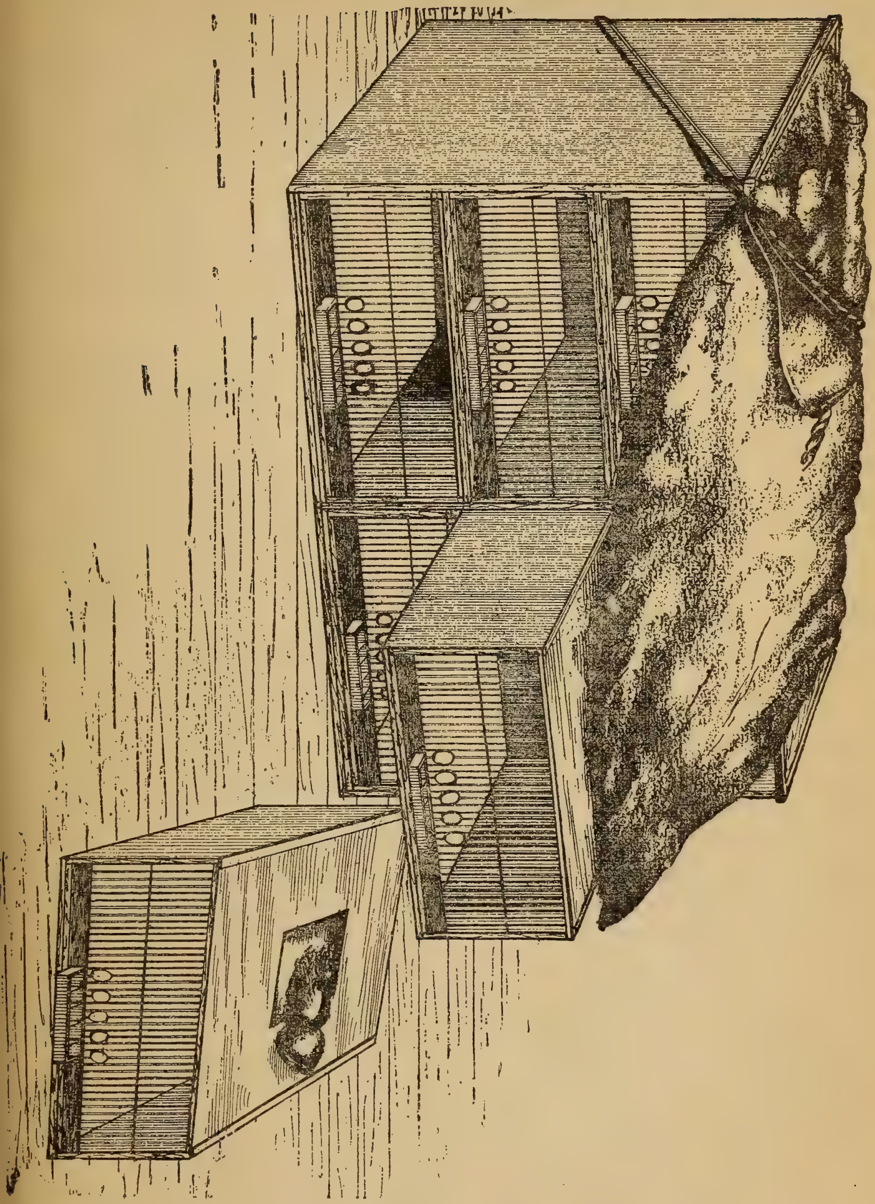

FIG. VII.

in Fig. I, the lines attached, some food for birds placed at ends of fly-stick and their water-cups put down and filled. Then we can put on the pull-line, the ends of the arms entering into the same eyes of top lines the buttons of staffs have, as shown in Fig. VIII. Now we are all ready but the braced-birds, which are put on sticks by passing the loop at the end entirely through the ring of brace, then passing bird through the loop and pulling tight on ring. We now take the empty pack and retire to end of pull-line, and when seated upon camp-stool we are ready for business.

HOW TO TAKE CARE OF THE BIRDS.

The management and handling of the birds after they are caught is a very important feature, for if used for trap purposes it will be necessary to keep them in the most vigorous condition possible from the moment they are caught until used. They should be given a little seed in the blind cages, as also water in the dips outside, and the cage must be kept out of the sun, but the sooner they can be liberated into the ultimate place designed for keeping them the better. This can be either a room or out-building sufficiently tight to hold them, provided with ledges and perches, which would be more convenient when catching them out again if made portable. Their staple food here should be feed-meal (yellow corn) and wheat, with an occasional change of some other small grain or seed, or soaked stale bread, and they should be liberally fed and watered at least once a day. Their water should be given in large, flat pans, and the floor of the room should be covered with sand. If the room is not too high the birds can be caught out of it by means of a long landing net used in fishing. A flat store cage should be used to convey the birds where they are to be used, and care taken of them by seeing that they have food and water and are kept in a quiet place out of the sun, when, if there are any left, they can be returned to the room without injury. In handling the bird avoid pressure on its body; hold it firmly, and without tremor, between the forefinger and thumb around its neck—thumb across its throat, back of bird next the palm of hand—and when it is necessary to change its position in the hand, always keep the hands moving when doing so or it may escape.

Now this may all appear too extensive and complicated at first for some to attempt, but there are members of every club who have sufficient ingenuity and intuition to construct and use their own nets, which would not only be a gratification of their individual pleasure, but also a source of profit and advantage to the members in general. With these nets, and by following the instructions given, the merest tyro could catch a great many birds in a day—frequently a hundred or more. It should always be borne in mind that the method is not in any way to be considered as a baited trap, but that the principle involved is to take the bird unawares—to fool it—and that it is easier to fool one than ten. The number caught at the end of the day will depend largely on bagging every bird that comes within the scope of the nets. Make it a rule to be satisfied with one, if no others are in sight, for after the old adage "a bird in the hand," etc., a Sparrow in the nets is worth seventeen on the fence.

As to the when and where to go, while there are some given rules for this, still the birds are so quick to take alarm, and so communicative, that it is not possible at times to account for their movements. Their vast numbers and nomadic habits, however, will offset this, and by a little study of the habits of the bird, and by a few practical lessons in the shape of successes and failures, it will not be difficult to determine where a good catch can be made.

SECTION SIXTH.

HISTORY OF THE HOUSE SPARROW, PASSER DOMESTICUS, AND THE EUROPEAN TREE SPARROW, PASSER MONTANUS, AT SAINT LOUIS, MO.

By Otto Widmann.

The first European House Sparrows (*Passer domesticus*) were introduced at Saint Louis in 1869, when Mr. Cairns received a few pairs from New York City. They were liberated in the heart of the city, but were immediately lost out of sight. The following year the same party repeated the experiment with the same result, that is, the birds did not remain in the immediate neighborhood, but left for parts unknown at the time.

Early in 1870 a Saint Louis bird dealer imported, among other birds, twenty Tree Sparrows (*Passer montanus*) direct from Germany. Mr. Kleinschmidt, hearing of it, persuaded Mr. Daenzer, of the *Anzeiger des Westens*, who was at that time experimenting with the introduction of European singing birds, to contribute to the purchase of these birds. Accordingly they were bought and taken to Lafayette Park, in the then southwestern part of the city, and liberated April 25, 1870. All left the park immediately, and none were seen again until April 24 of the following year, when a single bird was seen one mile east of the park. This discovery was considered worthy of mention in the public press, since at that time the introduction of the European Sparrow at Saint Louis was thought to be a failure. That this was an error became apparent during the ensuing summer, when these discoveries were reported so often, and from parts of the city so widely separated, that success could no longer be doubted.

During the next few years bird dealers had pairs of House Sparrows sent from New York, and well-meaning citizens bought them for liberation, but the exact number can not be learned, since the principal parties have died. Both species increased amazingly, and as early as 1875

Passer had spread over the entire 64 square miles which make up the city of Saint Louis. In the southern part the Tree Sparrows predominated, and as late as 1877 no House Sparrow was seen on my premises, one mile south of the arsenal, which latter point they had then occupied in large numbers. Also during the winter of 1877–'78 all of my twelve boxes set up for Sparrows were in undisputed possession of the Tree Sparrows.

On March 28, 1878, the first House Sparrow appeared on the scene, and trouble began. One pair of Tree Sparrows was dislodged and a pair of House Sparrows began nest-building. That summer no increase in House Sparrows took place in my colony, and the Tree Sparrows reared their broods in peace, but when the first cold October nights forced the Sparrows to change their roost from the now nearly leafless trees to some warm shelter, a whole flock of House Sparrows took possession of the boxes and the Tree Sparrows had to leave. Thereafter the weaker Tree Sparrow had little chance to gain a suitable nesting site around its old home. Only one pair continued breeding for a few years longer, in a box which, besides hanging lower than the rest, had an entrance which the bigger House Sparrows found uncomfortably small. It appeared to me that the Tree Sparrow would be much more of a house sparrow if his stronger cousin did not force him to be a tree sparrow by robbing him of every suitable nesting and roosting place about human habitations.

With the increase of the House Sparrow the Tree Sparrow had to yield the city almost entirely to him and betake himself to the country, spreading in all directions and resorting to tree-holes and out-of-the-way places, while the other took the cities and towns.

This Tree Sparrow is a much more acceptable acquisition than the House Sparrow. Although sharing many of its habits, it lacks the fighting qualities for which the other is so much hated. Of course, like every bird, it defends its home against intruders, but it is not aggressive. It never attacks other birds for mere sport, like its cousin; on the contrary, it enjoys the company of our native birds, and it is daily seen associating with our wintering Junco and Canada Tree Sparrow. With this latter bird it has some notes in common, and it seems that this resemblance of the voice led the early European settlers to apply the name of Tree Sparrow to this otherwise entirely different bird, a misnomer which in turn gave rise to the equally inappropriate scientific names "montana" and "monticola."

The voice of the European Tree Sparrow, although it can not be called a song, is really melodious, especially when a number of them, as is generally the case, join in common concert, much like our bobolinks and blackbirds.

Not more than two broods are raised annually, while the House Sparrow often raises three, but not four to six, as some claim.

About the bad qualities of the imported Sparrow nothing new can be said, and from my own observation I can not even corroborate the statements already published. It is a strange coincidence that with the increase of the Sparrows our peaches became more and more scarce, but I am not prepared to say that *Passer* ate them before they were born—that is, in the bud.

I can say that the martin, the bluebird, and the wren find it hard to withstand the intruder, but I hope they will learn from him, and thereby become more efficient in their resistance. I dare to say that the martin has already learned much within the few years of contact and contest. The martins have become more careful in the guarding of their chosen home, and I might add they have become more courageous in defending this home.

Immediately on arriving in early spring the martin seeks a box—his old box of last year, if possible. A few days afterwards his mate joins him, and the pair regard the chosen box as their home long before they begin nest-building. During this time, in the full enjoyment of their honeymoon, the pair used to leave home together when going out in search of food. Of late they have begun to take turns, one staying at home to keep the Sparrows out. This is an important strategical progress, because it is comparatively easy to keep the Sparrow out of a box, but it is impossible for a martin to dislodge him after he has built a nest.

Besides being much more intelligent and courageous than the birds with which it comes in conflict, the House Sparrow has several really good qualities which are worthy of imitation by our native birds. Its diligence is marvelous. After removing their nest in the evening, one is surprised to see the heap of material which this single pair has carried in within a few hours the following morning; and this is done day after day with wonderful perseverance.

But the most prominent trait of its character, and the one which explains in a great measure the immense multiplication of the species, is the unsurpassed attachment of the parent Sparrows for their offspiring. A Sparrow never deserts its brood. If one of the parents is killed, the other will do all the work alone. If a young one happens to fall down from the lofty nest, it is not lost; the parents feed it, shelter, and defend it. If a young Sparrow is taken from the nest and placed in a cage, the mother feeds it for days and weeks, even if she has to enter a room to get to it. Many young martins tumble out of their nests, and are invariably lost. The parents make much noise about it, and try to make the young fly up, but finding that they can not do it, they let them perish, and even if placed where they could easily get to them, they do not feed them. In times of drought many young martins starve to death, being sometimes entirely deserted by the parents.

While from the four to six eggs which the martin lays, on an average only two young are successfully reared, the Sparrow succeeds in bringing up all the young hatched, which are four or five.

The Sparrows have traits of character which may set a good example to some of our birds, and I hope they will follow it. If they do so, the danger of being displaced by the foreigner will be greatly diminished. (March 10, 1888.)

As a great lover of birds, I am naturally inclined to be mild in censuring their misdeeds, and although I have been living in war with the House Sparrow since its appearance, I still hoped sometimes that our native birds would learn to repulse the intruder, and that its presence might yet be tolerated to a certain degree. It was in such a spirit of reconciliation that I wrote last March, but the experience of this spring has demonstrated more clearly than ever that leniency toward the House Sparrow would be a crime. A careful watch has revealed the fact beyond doubt that the House Sparrow destroys the eggs of the martin by eating them up without leaving even a trace behind. Six nests were thus destroyed, with from four to six eggs in each. The martins had defended their nests successfully until the cool period about the middle of May, when the scarcity of winged insects caused them to go far from home and to stay away long. This absence from their nests enabled the Sparrows to enter the boxes and to eat the eggs.

In one case *Passer* was hindered from proceeding farther than drilling holes ($\frac{1}{4}$ by $\frac{3}{8}$ inch), through which he probably intended to empty the contents of the eggs and then finish by eating the shells. In the other cases the eggs disappeared without leaving any traces. Only in one case did the Sparrows begin to build in the box; in all other cases the nests were left undisturbed.

The martins watch their treasures well enough during the morning hours, but in the afternoon, especially in cool or dry weather, they like to go off for a hunt and to stay away for several hours. This is the time when the Sparrows sneak into the boxes, and it requires constant vigilance on our part to keep them off and to save the eggs (eighty-five contained in the boxes to-day).

As long as eight years ago, seeing that the House Sparrow became irrepressible, I tried to compromise with him by putting up separate boxes for his special use, giving him to understand that he would be tolerated there, but nowhere else. This plan seemed to work well, but for a short time only, and I soon found that the only way to deal with them was to destroy their nests and young ones.

Last spring, being much warmer than this year, was favorable for the martins; they could stay about home nearly all the time, and it really seemed as if they had learned to be more effective in the defense and repulse. But this cool spring showed me that the martin is too much dependent on the weather to be a successful defender of its home, and the verdict is, therefore, that the House Sparrow will no longer be tolerated on my grounds, and that it will be destroyed without mercy, by any means, and at every time of the year, not merely in spring as heretofore. (Saint Louis, Mo., June 2, 1888.)

PART II.

EVIDENCE.

EVIDENCE.

SECTION FIRST.—ORIGINAL TESTIMONY IN DETAIL.

Little need be added here to what has been said already in the introduction to the Bulletin. The majority of the evidence printed here was received in reply to printed questions contained in a circular and schedule distributed in the latter half of 1886. These questions were as follows:

The Department of Agriculture desires facts, from personal observation, in answer to the following questions concerning the European House Sparrow, commonly called "English Sparrow," in this country.

I. Is your locality city, suburb, or country?

II. Is the English Sparrow present in your vicinity? If not, what is the nearest point at which you know it to occur? If present, when did it first appear?

III. Is it abundant and on the increase?

IV. Is it protected by law?

V. Is it artificially housed and fed?

VI. How many broods and young does a single pair rear in a season?

VII. Do any of our non-predatory birds habitually resist encroachments of, or attempt to drive off, the English Sparrow unless themselves first attacked? If so, what kinds and with what success?

VIII. Which of our native birds attempt to reclaim former nesting sites when these are occupied by the Sparrows? Give examples.

IX. Has the English Sparrow been observed to molest or drive off any of our native birds? If so, what species are so molested or expelled from their former haunts?

X. Does it injure shade, fruit, or ornamental trees or vines? If so, give examples.

XI. Does it injure garden fruits and vegetables? If so, give examples.

XII. Does it injure grain crops? If so, give examples.

XIII. Has any case in which it has been of marked benefit to the farmer or horticulturist come under your notice? If so, in what way has the benefit been derived?

XIV. Under what circumstances does it feed upon insects? What kinds of injurious or beneficial insects or their larvæ does it destroy and to what extent?

XV. What means, if any, have been taken to restrict the increase of the English Sparrow?

XVI. What is the prevailing public sentiment in respect to the bird?

Information is particularly desired concerning the presence of the English Sparrow in the Southern States and in the region west of the Mississippi.

A circular issued by the Department of Agriculture in July, 1885, contained three or four questions on the English Sparrow, but these are covered by the above circular, except that one question asked for information as to injury to "grapes or other fruits." Replies to some of these questions were received from a few persons who did not contribute information in reply to the later circular.

About one hundred and ten persons answered a circular sent out in 1883 by a committee of the American Ornithologists' Union, and these replies have been incorporated in the evidence now printed. The questions were similar to those subsequently sent out by the Department of Agriculture, but made more particular inquiries as to the food of old and young Sparrows, and the variation in food dependent on season and location. Replies to these questions will be recognized readily by the date—1884 or earlier.

The replies from all these sources have been grouped under seven heads, as follows:

(A) Distribution by States.
(B) Rate of increase; checks, natural and artificial.
(C) Injury to buds and foliage.
(D) Injury to fruits, garden seeds, and vegetables.
(E) Injury to grain crops.
(F) Relation to native birds.
(G) Relation to insects.

The material under each head has been arranged alphabetically by States, and under each State alphabetically by post-offices. Information relating to Canada follows that relating to the States.

As already noted in the introduction, every scrap of information relevant to the inquiry will be found here in its appropriate place, under the name of the person contributing it, and accompanied, whenever possible, by the exact date and locality to which the information relates.* Moreover, in most cases each bit of testimony is followed by the number of years which the Sparrow is believed to have been present at the point named.

Whenever possible, the replies have been printed in the same form in which they were received, and when it has been found necessary to change the form of a reply, either in dismembering a statement relating to several subjects or in condensing several statements relating to the same subject, the utmost care has been taken to preserve the exact meaning of the observer.

As a rule, all statements received in reply to questions have been printed in full, the main exceptions to this rule being in cases of (*a*) evident misapprehension of the question; (*b*) replies too vague and indefinite to be of any value; (*c*) hearsay statements, which could not be considered as evidence.

As was to be expected, a large amount of purely negative evidence was received. Hundreds of observers wrote simply yes or no after most of the questions, and when such reports contained nothing to show that the writers had ever taken pains to notice the Sparrow's habits at all, it seemed unadvisable to print these replies. The fact has been kept constantly in mind, however, that all omissions might be construed by some as evidence of partiality or prejudice, and this is the only excuse for retaining many statements which seem to contain nothing of value.

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* This plan was reluctantly, but necessarily, adandoned. See foot-note on page 12, in introduction.

The friends of the Sparrow, as well as its enemies, have been guilty of numberless intemperate utterances, which have served no useful purpose whatever. The following pages contain sufficient *evidence* for an impartial verdict, and no apology is made (and none is deemed necessary) for the omission of *mere opinions*, unsupported by evidence of any kind.

DISTRIBUTION BY STATES.

In ALABAMA the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Anniston	1883	A. L. Tyler.	Jacksonville	1883	G. B. Douthit.
Athens	1880†	Postmaster.	Midway	1880	M. E. Pruett.
Auburn	1883†	State Agr'l Dep't.	Montevallo	1885	F. A. North.
Brierfield	1885†	Jno. F. Bondman.	Moulton	1885	J. M. Sandlin.
Calera	1884†	P. T. Wagner.	New Market	1886	Dr. George D. Norris.
Centre	1884	J. J. B. McElrath.	Notasulga	1883†	Sam. Duke.
Clanton	....	F. A. Hannon.	Oxford	1881†	Fannie Shuford.
Clayton	1883	E. R. Quellin.	Rock Mills	1884	Postmaster.
Cross Plains	1884	W. A. Wilson.	Salem	1884	Sam. W. Burt.
Cullman	1884	S. H. Herrin.	Scottsborough	....	A. Snodgrass.
Do	1882	Dr. W. L. Mangum.	Talladega	1880	R. R. Hunley.
Dadeville	1884	Postmaster.	Tuscumbia	1883	F. A. Ross.
Edwardsville	1886	W. H. Howle.	Tuskegee	1884	Samuel Q. Hale.
Do	1886	Postmaster.	Union Springs	1880	Henry Harris.
Eufaula	1882	E. L. Brown.	Weaver's Station.	1885	Postmaster.
Guntersville	1884	Postmaster.	Wetumpka	1885	G. A. B. Smith.
Hayneville	1886	Tom Baine.			

† About.

It was reported not present at the following places in Alabama:

Locality.	Observer.	Locality.	Observer.
Albertville	William A. McCreless.	Larkinsville	Dr. Andy Boyd.
Blount Springs	Postmaster.	Linden	C. B. Cleveland.
Blountsville	Rufus B. Simms.	Livingston	K. E. Hopkins.
Camden	J. J. Roach.	Monroeville	F. A. Seymour.
Carrollton	D. C. Hodo.	Mount Vernon	Christian Becker.
Columbia	W. C. Kornce.	Ozark	Postmaster.
Daphne	John Wilson.	Pine Apple	M. A. Carter.
Eutaw	M. P. Brugh.	Prattville	George W. Ward.
Evergreen	Postmaster.	Rutledge	Postmaster.
Flora	John A. Weems.	Smelley	W. F. Ponder.
Geneva	Postmaster.	Tallassee	J. A. Dubberly.
Good Water	D. B. Brown.	Tuscaloosa	W. H. Wilds.
Greensborough	Dr. W. C. Avery.	Vernon	A. A. Wall.
Jasper	J. F. Haley.	York Station	R. B. Hightower.

In ARIZONA, in the summer of 1886, the Sparrow was known to be present at but one point. Lieut. Harry C. Benson states that it was then established at Camp Huachuca.

It was reported not present in the autumn of 1886 at the following places in Arizona:

Locality.	Observer.	Locality.	Observer.
Flagstaff	J. R. Kilpatrick.	Tucson	Herbert Brown.
Florence	John Miller.	Yuma	J. H. Taggart.

In ARKANSAS the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Avoca	1883	D. D. Ames.	Little Rock	....	Carl von Jagersfeld.
Berryville	....	Postmaster.	Lonoke	....	A. F. Huntsman.
Clarendon	1886	Horace Ward.	Marianna	1885†	Postmaster.
Dallas	1876	T. M. Carder.	Marion	1882	Do.
Helena	1883	J. O. Bagwell.	Nashville	1881†	W. J. Lee.
Hot Springs	1880†	Richard d'Ailly.	Osceola	1880†	Dr. D. A. Richardson.
Do	1876	Postmaster.	Poplar Grove	1882	James R. Turner.

† About.

It was reported not present at the following places in Arkansas:

Locality.	Observer.	Locality.	Observer.
Argenta	Charles J. Humphreys.	Harrison	J. W. Andrews.
Arkadelphia	B. Cook.	Harrisburgh	M. D. Simmons.
Augusta	J. P. Ferguson.	Hope	T. H. Bayless.
Austin	Robert L. Brown.	Jacksonport	William A. Monroe.
Batesville	F. D. Denton.	Jasper	Postmaster.
Beebe	L. B. Gist.	Jonesborough	John W. Owens.
Booneville	John M. Oathout.	Lewisville	B. P. Wheat.
Do	J. S. Lambkin.	Little Rock	John Karr.
Boonsborough	W. D. McBride.	Do	S. H. Nowlin.
Camden	W. F. Avera.	Lockesburgh	F. C. Floyd.
Carlisle	James Hennessey.	Malvern	Richard d'Ailly.
Centre Point	Postmaster.	Marshall	Postmaster.
Charleston	A. P. Richardson.	Morrilton	H. T. Gordon.
Clarksville	Postmaster.	Mountain Home	J. S. Russell.
Clinton	W. R. Greeson.	Mountain View	Joseph Hixson.
Coal Hill	J. M. Bench.	Mount Ida	G. D. Goodner.
Conway	A. R. Witt.	Mulberry	J. W. Bailey.
Corning	C. R. Beloate.	Murfreesborough	Postmaster.
Cotton Plant	W. T. Echols.	Ozark	Jno. Berry.
Danville	Postmaster.	Pine Bluff	W. H. Westbrook.
Des Arc	J. J. Baugh.	Pocahontas	S. T. Thompson.
Devall's Bluff	Reuben B. Carl Lee.	Quitman	W. M. Garner.
Dover	H. Kinthof.	Rocky Comfort	Samuel Walters.
El Dorado	M. A. Craig.	Rogers	Postmaster.
Eldridge	Postmaster.	Russellville	W. T. Reynolds.
Eureka Springs	Jno. H. Hamilton.	Searcy	John C. McCauley.
Fayetteville	Prof. F. L. Harvey.	Sheridan	J. N. Noll.
Do	Prof. George D. Purinton.	Sulphur Rock	Postmaster.
Do	Postmaster.	Toledo	Do.
Fort Smith (?)	Dr. F. W. Johnson.	Waldron	M. M. Beavers.
Do	W. J. Fleming.	Warren	Postmaster.
Gainesville	Thomas W. Crawford.	Washington	Carl von Jagersfeld.
Greenbrier	J. K. Donnell.	Witcherville	S. E. Smith.
Gurdon	W. D. Gage.	Wittsburgh	Postmaster.
Hampton	L. G. Tomlinson.		

In CALIFORNIA the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Berkeley	1884	Dr. M. C. O'Toole.	San Francisco	1879†	Wm. McK. Heath.
Cloverdale	1884	John Field.	Do	1877†	George P. Lowell.
Eureka	1885	Charles Fiebig.	Do	....	J. G. Scott.
Haywards	1880	Dr. J. G. Cooper.	Do	....	Colonel Warren.
Do	1880	W. Otto Emerson.	Do	1871†	A. H. Webb.
Hollister	1883	Will Steinbeck.	Do	....	E. J. Wickson.
Mission San José	1885	J. W. Musser.	San José	....	F. H. Holmes.
Napa City	1884†	Postmaster.	Do	1881†	A. L. Parkhurst.
Oakland	1880†	Walter E. Bryant.	Stockton	1883	L. Belding.
Do	....	E. F. Lorquin.	Do	1880 [?]	Postmaster.
Redwood City	1874	H. Jacobson.	Vallejo	....	Fred. T. Bond.
San Francisco	1875†	F. Gruber.			

† About.

It was reported not present at the following places in California:

Locality.	Observer.	Locality.	Observer.
Arcata	Carl C. Marshall.	Oroville	John J. Smith.
Arbuckle	Dr. C. H. Gibbons.	Pacheco	Postmaster.
Bodie	A. M. Phlegan.	Quincy	J. E. Pardee.
Bolinas	I. C. Gibson.	Riverside	R. P. Chandler.
Colusa	Bennett A. Pryor.	Rohnerville	S. H. Crabtree.
Downieville	Postmaster.	San Buenaventura	Dr. Stephen Bowers.
Dutch Flat	B. F. Walker.	San Diego	G. Holterhoff, jr.
Fresno City	W. M. Williams.	Do	J. H. Orcutt.
Grass Valley	S. G. Lewis.	San Luis Obispo	McD. R. Venable.
Hanford	E. J. Plummer.	Santa Barbara	William Lavies.
Igo	E. L. Ballou.	Sebastopol	John Dougherty.
Los Gatos	C. A. Menefee.	Tomales	Postmaster.
Marshall	Joseph Palla.	Visalia	Susman Mitchell.
Mokelumne	Thomas Peters.	Wilmington	A. Laubersheimer
Murphy's	John J. Snyder.	Windsor	B. F. Bennel.
Nevada City	Wallace J. Williams.	Yreka	Postmaster.

In COLORADO the Sparrow was reported present only from Denver, and there is some doubt as to its presence there now. Mr. Edward E. Achert states that he let loose six pairs in Denver about 1877, but all subsequently disappeared.

Mr. W. C. Wynkoop says there were a few there in October, 1886, though their presence was not generally known. They were first seen there about a year earlier. Several other residents of Denver are positive that it did not exist there in 1886.

It was reported not present at the following places in Colorado:

Locality.	Observer.	Locality.	Observer.
Alfalfa	Postmaster.	Evans	John H. Farrar.
Aspen	James C. Connor.	Fair Play	A. Schringer.
Boulder	J. A. Sewall.	Fort Lewis	I. G. Price.
Buena Vista	C. B. Wilson.	Georgetown	S. C. Bennett.
Caddoa	J. E. York.	Glenwood Springs	James H. Kerwin.
Cañon City	A. L. Hayes.	Golden	Arthur Lakes.
Do	G. G. Shayer.	Gold Hill	Jay Thompson.
Catlin	J. M. McClain.	Granada	Guy R. Potter.
Coal Creek	G. S. Warner.	Grand Junction	Thomas B. Crawford.
Colorado Springs	Charles E. Aiken.	Greeley	O. Howard.
Do	Postmaster.	Do	C. W. White.
Conejos	S. W. Hatch.	Holly	C. L. McPherson.
Corona	Postmaster.	Howardsville	T. M. Trippe.
Denver	A. T. Allen.	Hugo	A. K. Clark, jr.
Do	A. W. Anthony.	Hyde	Postmaster.
Do	H. G. Smith.	Iliff	H. G. Mosher.
Do	Mrs. A. L. Peabody.	Irwin	Alex. Fraser.
Do	H. F. Wegener.	Longmont	Joseph J. Topleff.
Eckley	A. W. Voorhees.	Louisville	L. E. Andrews.
Elizabeth	Jennie R. Pierce.	Loveland	J. W. Seaman.
Erie	M. S. Haines.	Maysville	G. E. Blatchford.

Locality.	Observer.	Locality.	Observer.
Monarch	D. D. Hatfield.	Silver Cliff	Postmaster.
Montrose	A. E. Buddecke.	Snyder	D. E. Risedorph.
Nepesta	G. W. McReynolds.	South Pueblo	Postmaster.
Orchard	J. M. Parrott.	Starkville	W. R. Smethers.
Ouray	David Frakes.	Telluride	H. C. Lay.
Poncho Springs	C. Eubank.	Thatcher	J. M. Thompson.
Pueblo	H. W. Nash.	Tin Cup	D. Mawherter.
Querida	Postmaster.	Tomichi	E. F. Blain.
Red Mountain	Do.	Trinidad	H. Stark.
Rocky Ford	Do.	Villa Grove	Postmaster.
Saguache	R. H. Jones.	Walsenburg	Do.
Salida	Dr. C. B. Underhill.	White Pine	Do.
Sedgwick	A. D. Moorhead.	Wray	Nathaniel Sisson.

In CONNECTICUT the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Brookfield Centre.	....	George C. Jones.	New Haven	1876†	Louis B. Bishop.
East Hartford	1878†	Willard E. Treat.	Do	....	Frank S. Platt.
Ellington	1880†	S. T. Kimball.	Do	....	Robert D. Camp.
Farmington	1878†	Henry H. Mason.	Norwich	1872†	G. Geduldig.
Gaylordsville	....	E. H. Austin.	Do	1866†	S. T. Holbrook.
Hartford	1874†	Mrs. W. Seliger.	Plantsville	1877†	E. R. Newell.
Do	....	W. G. Talmadge.	Portland	1869	John H. Sage.
Do	1878†	Daniel S. Wadsworth	Ridgefield	1882	Edward J. Couch.
Jewett City	1875†	Dr. Geo. H. Jennings	Rockville	1882†	C. D. Tucker.
Manchester	1872†	James B. Olcott.	Sharon	1875†	George M. Marckres.
Mansfield	1885	Prof. B. F. Koons.	Shelton	1874†	J. Tomlinson.
Meriden	1870	H. C. Hull.	South Woodstock.	....	Mrs. G. S. F. Stoddard.
Middle Haddam	1878	Henry L. Stewart.	Stratford	1872†	Robert W. Curtiss.
Middletown	1870†	Walter B. Barrows.	Suffield	....	Jesse F. Smith.
New Haven	1871	A. C. Sheldon.	Windsor	1879†	Stephen Hills.

† About.

In DAKOTA, in the autumn of 1886, the Sparrow was known to be present at but one point. Mr. O. M. Whaling states that it appeared at Milltown early in 1885. It was reported not present at the following places in Dakota:

Locality.	Observer.	Locality.	Observer.
Aberdeen	Charles A. Fisher.	Elkton	Postmaster.
Alexandria	Postmaster.	Ellendale	Do.
Altamont	Do.	Estelline	C. P. Gould.
Argusville [1885]	S. M. Edwards.	Fairview	W. H. Hubbard.
Arlington	Postmaster.	Fargo	Postmaster.
Ashton	Do.	Fort Abraham Lincoln	William Cannon.
Athol	C. M. Sullivan.	Goodwin	G. F. Nelson.
Aurora	Postmaster.	Hamilton	G. W. Boylan.
Bath	Thomas Edwards.	Harold	John A. Sigler.
Beresford	Thomas T. Brady.	Henry	E. H. Waldron.
Big Stone City	L. A. Card.	Hope	Postmaster.
Bismarck	Andrew T. Sherwood.	Hudson	T. W. Millham.
Blanchard	Douglas Robertson.	Huron	Dana Duran.
Blunt	Charles A. Berger.	Do	George T. Love.
Bon Homme	B. D. Graves.	Do	George Wilder.
Brandon	William J. Jones.	Hyde Park	James Kyle.
Bristol	E. Stevenson.	Iroquois	Postmaster.
Buxton	Postmaster.	Jamestown	Do.
Canton	O. A. Rudolph.	Kelso	George H. F. Johnson.
Casselton	L. J. Fulton.	Kindred	Postmaster.
Castlewood	William Marshall.	La Moure	N. B. Wilkinson.
Cavour	Andrew J. Sweetser.	Larimore	T. F. Eastgate.
Chamberlain	William Gilman.	Le Beau	J. J. Jones.
Clark	S. D. Jeffries.	Lisbon	J. Durbin.
Columbia	J. R. James.	Madison	J. M. Preston.
Crandon	Flora Z. Wagner.	Manvel	W. B. Stevenson.
Cumings	D. B. Wilbur.	Mapes	H. K. Stearns.
Dwight	S. R. Norris.	Marion	John Ryan.
Egan	Postmaster.	Marvin	Charles B. Williams.

Locality.	Observer.	Locality.	Observer.
Meckling	C. N. Taylor.	Salem	Postmaster.
Medora	Postmaster.	Sanborn	Do.
Mellette	W. T. Dale.	Sheldon	James W. Allen.
Millbank	Charles L. King.	Sioux Falls	Postmaster.
Miller	W. H. Kephart.	Springfield	M. Griffin.
Milnor	Postmaster.	Steele	Postmaster.
Minto	John Gallagher.	Troy	Do.
Do	Fred. Twamley.	Vermillion [1885]	Dr. G. S. Agersborg.
Mount Vernon	Postmaster.	Vermillion	C. G. Shaw.
Neche	Do.	Wahpeton	B. C. Wilson.
Northville	S. K. Stanles.	Walhalla	T. S. Builey.
Northwood	Postmaster.	Warner	W. P. Kingston.
Olivet	G. W. Baker.	Webster	J. B. Prendergast.
Oriska	Alfred C. Lee.	Wentworth	Postmaster.
Parker	John J. Cutter.	White Lake	James McCauley.
Portland	H. A. Langlie.	Willows	David H. Henman.
Rapid City	Postmaster.	Wilmot	Postmaster.
Rockport	Do.	Wolsey	Harrie A. Watson.
Rousseau	M. C. Rousseau.	Yankton	L. D. Palmer.

In the DISTRICT OF COLUMBIA the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Mount Pleasant	1872†	William Holmead.	Washington		George Henning.
Washington	1872†	Michael Durkin.	Do.	1870†	Robert Ridgway.

† About.

In FLORIDA the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	Observer.	Locality.	Observer.
Cerro Gordo	N. B. O'Donoho.	Lake City	Prof. A. Q. Holladay [1882]*
Crescent City	Sidney L. Benham.	Tampa	W. H. Dall.

* First appeared.

It was reported not present at the following places in Florida:

Locality.	Observer.	Locality.	Observer.
Apalachicola	John W. Wakefield.	Lake City*	J. J. Thompson.
Apopka	Postmaster.	Leesburgh	F. C. Childs.
Archer	Do.	Madison	H. J. McCall.
Baldwin	G. W. Ford.	Mandarin	W. Y. Merry.
Bartow	R. H. Burr.	Marianna	Q. E. Hearn.
Bronson	C. E. Taylor.	Micanopy	Postmaster.
Cedar Keys	Postmaster.	Millview	Rix M. Robinson.
Chaires	Do.	Milton	I. M. McGehee.
Clear Water Harbor	I. K. Munnerlyn.	Monticello	John W. Garwood.
Cottondale	John E. Voss.	Mount Pleasant	Postmaster.
De Land	C. F. A. Bielby.	New Berlin	A. W. Lawless.
Enterprise	J. E. Alexander.	Norwalk	D. L. Morgan.
Euchee Anna	Postmaster.	Ocala	L. Dorier.
Federal Point	J. F. Tennly.	Orange City	F. C. Austin.
Fernandina	Samuel T. Riddell.	Orlando	E. W. Speir.
Gainesville	Frank M. Chapman.	Palmer	C. S. Goss.
Green Cove Springs	Thomas Roberts.	Plant City	E. S. Tyner.
Highland	Postmaster.	Quincy	Postmaster.
Houston	Dr. C. T. McMannen.	Rosewood	C. M. Jacobs.
Do	Postmaster.	Saint Augustine	Postmaster.
Jacksonville	William H. Ashmead.	South Lake Weir	William Foster.
Jasper	R. J. McKee.	Tallahassee	D. W. Gwynn.
Key West	Postmaster.	Tampa*	H. R. Benjamin.
Lake Butler	M. C. Levy.	Waldo	Samuel J. Kennard.

* Reported present by another observer.

C. L. Hopkins (Department of Agriculture, Washington, D. C.) reports no English Sparrows seen or heard of at any points in Florida visited by him August 23 to September 10, 1887. The points visited were Jacksonville, Astor, Umatilla, Eustis, Tavares, Sanford, Orlando, and intermediate points.

In GEORGIA the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Albany	1867	Postmaster.	Isabella	1876	Postmaster.
Alpharetta	1884	William A. Porter.	Jackson	1881†	Do.
Americus	1884	M. B. Council.	Jonesborough	1876†	J. C. Haws.
Do	1876†	W. C. Furlow.	Kingston	1884	Postmaster.
Appling	1886	Postmaster.	Knoxville	....	J. H. Halt.
Atlanta	....	Hon. W. A. Harris.	La Grange	1881†	Thos. H. Whitaker.
Do	1876†	R. J. Redding.	Lawrenceville	1883†	Postmaster.
Do	....	Postmaster.	Lawtonville	1880†	Do.
Augusta	1871†	Dr. J. P. H. Brown.	Lexington	1882†	John T. M. Hairn.
Do	1878	K. Boyce.	Lumpkin	1881†	A. W. Latimer.
Buena Vista	1884	Thomas B. Lumpkin.	Do	1883	J. B. Latimer.
Byron	1881	V. E. Walton.	Macon	....	F. M. Francis.
Calhoun	1881†	J. M. Harkins.	Do	....	Thomas Hardeman.
Camilla	1882	Miss Etta Culpepper.	Do	1870†	Prof. J. E. Willet.
Canton	1882	H. C. Kellogg.	Marietta	1871	Hugh N. Starnes.
Carnesville	1878	W. J. Fincher.	Martin	....	Postmaster.
Carrollton	1885†	E. A. Merrell.	Meriwether	....	B. H. Myrick.
Do	1882	M. R. Russell.	Midville	1886	Postmaster.
Cartersville	1883†	William Milner.	Milledgeville	1880	Do.
Cedartown	1884	Postmaster.	Morgan	1885	J. H. Coram.
Clayton	1877	Do.	Moultrie	1884	E. A. Milligan.
Covington	1883	James M. Levy.	Oxford	1882	Mary W. Henderson.
Crawford	1885	C. S. Hargrue.	Palmetto	1882	Simeon Zellars.
Cumming	1884†	Paul A. Clement.	Paschal	1885†	Postmaster.
Cuthbert	1880	J. R. Owen.	Perry	1879†	T. M. Killen.
Eatonton	1876	S. C. Prudden.	Pope's Ferry	1880	W. D. H. Johnson.
Elberton	1882	Postmaster.	Rome	1882†	Postmaster.
Fairburn	1883†	George Latham.	Savannah	1878	J. N. Johnson.
Fort Valley	1879†	Postmaster.	Smithville	1881	G. W. Warwick.
Georgetown	1885	R. G. Morris.	Sparta	1880†	Postmaster.
Gordon	1881	J. G. Pearson.	Summerville	1884	George D. Hollis.
Greeneville	1882	Postmaster.	Swainsborough	....	J. M. Nunez.
Greensborough	1878	Do.	Talbotton	1876†	O. D. Gorman.
Griffin	1880	J. H. Barnes.	Tallapoosa	1885	J. H. Davis.
Do	....	Abel A. Wright.	Thomaston	1879	J. D. Alexander.
Hamilton	1880†	Charles L. Dendy.	Thomson	1881†	J. T. Neal and Dr. G. W. Durham.
Harmony Grove	1884	W. W. Jordan.			
Hartwell	1884	James L. Johnson.	Trenton	1884†	R. S. Rodgers.
Irwinton	....	A. W. Baum.	Ways Station	....	George L. Appleton.

†About.

It was reported not present at the following places in Georgia:

Locality.	Observer.	Locality.	Observer.
Allapaha	James H. Kirby.	Herndon	Joseph B. Jones.
Arlington	Postmaster.	Hollywood	William H. Hatfield.
Barton	Do.	Homer *	J. E. Stephens.
Blakely	H. C. Fryer.	Homerville	Sherod Smith.
Boggy	R. H. Chappelear.	Jeffersonville	M. E. Solomon.
Boston	J. W. Carmine.	Jesup	Postmaster.
Braganza	M. Albertson.	Marlow	Do.
Brunswick	Moses Daniel.	Neilly	N. A. Smith.
Cairo	S. A. Roddenberg.	Newton	B. F. Hudspeth.
Cameron	W. M. Henderson.	Oconee	C. W. Sneil.
Cochran	Quinn L. Harvard.	Quitman	Hiram Hubert.
Conyers	William L. Peek.	Rising Fawn	Postmaster.
Davisborough	F. M. Francis.	Rocky Ford	George Heard.
Dawson	R. G. Jones.	Roswell	Postmaster.
Dawsonville	Postmaster.	Saint Mary's	Do.
Dillon	I. W. Bryan.	Statesborough	B. E. Turner.
Douglas	W. R. Googe.	Sun Hill	C. D. Thigpen.
Dublin	Postmaster.	Traders Hill	R. Hatcher.
Eastman	Do.	Tusculum	Postmaster.
Ellijay	W. A. Cox.	Wadley	James A. Thigpenn.
Faceville	W. B. McDaniel.	Waresborough	Postmaster.
Fort Gaines	S. E. Lewis.	Waycross	A. H. Morgan.
Graham	Postmaster.	Waynesville	J. N. Highsmith.
Green's Cut	Do.	White Sulphur Springs	W. A. Gillespie, jr.
Hawkinsville	E. P. King.	Wrightsville	James H. Hicks.

* Reported abundant six months later.

In IDAHO, in the autumn of 1886, the Sparrow was known to be present at but one point. Mr. James Oliverson states that it appeared at Franklin in 1884. It was reported not present, in the autumn of 1886 and spring of 1887, at the following places:

Locality.	Observer.	Locality.	Observer.
Boisé City	G. S. Himrod.	Rexburgh..............	Henry Flamin.
Cherry Creek...........	Evan G. Jones.	Saint Charles..........	V. M. Pugmire.
Fish Haven	John Stoek.	Shoshone	Will. A. Gilmore.
Montpelier	Postmaster.	Silver City	E. H. Moore.
Paris	Annie Budge.	Weston................	Postmaster.

In ILLINOIS the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Albion...........	1871†	George Ferriman.	Johnsonville....	1883	James J. Johnson.
Aledo............	....	Charles W. Carter.	Knoxville	1881	O. L. Campbell.
Do...........	1885	J. F. Henderson.	Lenzburgh	1883	H. Volkening.
Alton	1872	Hon. Wm. McAdams	Louisville	1880	Conrad E. Kaehler.
Alton Junction..	1882	John Koch.	Marissa.........	1884	James I. Johnson.
Batavia..........	....	John Brady.	Moline..........	1876†	Daniel W. Gould.
Belleville	....	Aug. Barthel.	Monmouth	1872†	Dr. S. M. Hamilton.
Belvidere........	1880	A. E. Jenner.	Mount Carroll..	....	S. Hall.
Bernadotte	1885	Dr. W. S. Strode.	Do..........	1881†	Dr. Henry Shimer.
Campbell Hill ...	1881	Aug. Dudenbostel.	Mount Sterling.	1883	John J. McDannold.
Carbondale	1880	Prof. G. H. French.	Mount Vernon..	1878†	John S. Bogan.
Carlyle	1881	William S. Hervey.	New Athens....	1872	August Gierschner.
Carmi	1876	Dr. Daniel Berry.	Oak Park.......	....	Rev. George B. Pratt.
Centralia	1879	Jabez Webster.	Odin............	1881	W. Ingraham.
Chatham	1884†	Postmaster.	O'Fallon Depot .	1869†	D. D. Gartside.
Chicago	1874 [?]	H. K. Coale.	Olney.	1874†	J. C. Allen.
Do..........	....	Henry D. Emory.	Oquawka	1882	Postmaster.
Collinsville	1874†	Henry De Wald.	Paxton	....	G. W. Anderson.
Coultersville.....	1880†	Stiles H. Wirts.	Pekin	1870†	Postmaster.
Cullom	1880	P. J. Cook.	Peoria	1881†	W. S. Cobleigh.
Danville	1876†	W. T. Cunningham.	Quincy	1876	T. Butterworth.
Dubois	1882	Isom Chesney.	Do	1870	J. H. Richardson.
East Wheatland	1884†	William D. Patterson	Roberts.........	1878	E. O. Newman.
Fairbury	1882†	C. F. H. Carrithers.	Rockford	1878	Dr. F. H. Kimball.
Do.	1880†	A. H. Mundt.	Rock Island	....	W. H. Hatch.
Fernwood	1881	George B. Holmes.	Rushville.......	1880†	John S. Bagby.
Flora	1878	A. T. Galbraith.	Salem	1876	I. D. Lear.
Forreston	1876	J. D. Covell.	Do...........	1880	Louis O. Vogt.
Freeburgh. ...	1877	Charles Becker.	Sannemin.......	1880	C. S. Brydia.
Gilman	....	David H. Henman.	Shawneetown...	1881	George Rearden.
Golconda	1876†	Postmaster.	Swanwick	1883	M. S. Acheson.
Griggsville	1883	T. W. Parker.	Sycamore.......	1881†	L. E. Wyman.
Hamilton	1882	C. B. Rockwell.	Tamaroa........	1883†	S. R. Haines.
Hardin	1884	Alonzo H. Carter.	Tilden..........	1884†	Postmaster.
Hillsborough	1879	A. J. Edwards.	Troy............	1876†	Robert Williamson.
Do...........	1881	P. J. Edwards and William Abbott.	Warsaw	1880†	Charles K. Worthen.
Jacksonville.....	....	P. H. Rucker.	Watseka	1880†	L. F. Watson.
Do...........	....	Prof. J. B. Turner.	Waukegan......	1880	James Moran, jr.
Jerseyville	1881†	James S. Daniels.	West Belleville	....	George C. Bunsen.
Do...........	....	H. O. Goodrich.	Woodstock	1880†	A. S. Wright.
			Wright's Grove.	1875†	John Gall.

† About.

It was reported not present at the following places in Illinois:

Locality.	Observer.	Locality.	Observer.
Albany	E. H. Olas.	Hamilton *	W. L. Guthrie.
Colona Station.	R. R. Sale.	Harvel	Josephine Peebles.
Elliott	Joseph Richmond.	Percy	Isom Chesney.

* Reported present by another observer.

In INDIANA the Sparrow was reported present in the autumn of 1886 at the following places:

Locality	First appeared.	Observer.	Locality.	First appeared.	Observer.
Aaron	1882	F. W. Seaver.	Jasper	1880	J. F. Friedman.
Albion	1880†	Charles M. Clapp.	Laconia	1883†	George B. Byram.
Angola	1880	Frank M. Powers.	La Fayette	1874†	J. M. Dresser.
Bedford	1879	Noyes E. Strout.	Do	......	F. M. Webster.
Birdseye	1883	Herman Koerner.	La Porte	1880	Dr. Geo. L. Andrew.
Bloomington	1878	C. H. Bollman.	Leavenworth	1875	Postmaster.
Do	1875†	Prof. B. W. Evermann	Magnolia	1884	Peter J. Deutsch.
Booneville	1875†	William Swint.	Marengo	1863[?]	Postmaster.
Brazil	1879	D. W. Brattin.	Markland	1878	Julia B. Brown.
Burlington	1870†	W. A. Wright.	Milltown	1881†	Charles P. Trotter.
Camden	1881†	F. C. Groninger.	Mount Vernon	1876	A. A. Sparks.
Charlestown	1874	Postmaster.	Muncie	1880†	Granville Cowing.
Do	1882†	Dennis F. Willey.	Nebraska	1883	J. D. Kuster.
Corunna	1881	W. J. Lanning.	New Albany	1875†	John B. Mitchell.
Crandall	1885	G. W. Jenkins.	Do	1865[?]	James N. Payton.
Cynthiana	1876	Joseph L. Blasc.	Newbern	1883	U. F. Glick.
Deer Creek	1877†	Barnard and Plank.	Newburgh	1874	J. B. McKinney.
Delphi	......	John Barnard.	New Harmony	1876	Frank D. Bolton.
Dupont	1880	T. S. Williams.	New Washingt'n	1882	H. F. Work.
East Enterprise	1882†	William H. Madison.	Oakland City	1883	J. H. McClellan.
Edwardsville	1882	Edwin Yenowine.	Owensville	1880†	H. L. Strickland.
Evansville	1873	Dr. William Weber.	Patoka	......	William C. Fisher.
Farmland	1884†	N. W. Wright.	Patriot	1884	J. T. Bodkin.
Ferdinand	1878†	A. J. Fisher.	Poseyville	1882	Charles Kightly.
Fort Branch	1882†	C. F. Garrison.	Richmond	1869	Joseph C. Ratliff.
Frankfort	1878	A. B. Ghere.	Rochester	......	John M. Davis.
Fredonia	1884†	S. McFall.	Rome	1882	J. T. Connor.
Georgetown	......	L. M. Mottweiler.	Rosewood	1884	John H. Calvin.
Goshen	1880†	John W. Irwin.	Salem	1880†	Thad. Huston.
Greencastle	1872†	W. H. Ragan.	Scottsburgh	......	Melvin Hubbard.
Harristown	......	E. G. Berkey.	Stony Point	1875	Thos. H. Watlington.
Hazleton	1880†	J. H. Briner.	Tell City	1874	John L. Huber.
Henryville	1881	Postmaster.	Tobinsport	1886	C. C. Whitehead.
Holman Station	1882	W. V. Hardy.	Valparaiso	1880	E. S. Beach.
Home	1884	A. B. Tevis.	Vernon	1872†	Dalton Hinchman.
Hooker	......	Mary Benson.	Vevay	1875†	William R. Stratford.
Huntingburgh	1880	Morman Fisher.	Westville	1881†	E. L. Reynolds.
Indianapolis	1876†	J. G. Kingsbury.	Wheatland	1877	Robert Ridgway.
Ireland	1880†	Sue E. Williams.	Yeoman	1882	Charles Metsker.
Irvington	1870	Hon. S. Johnson.			

† About.

In INDIAN TERRITORY the Sparrow was reported not present in the autumn of 1886 at the following places:

Locality.	Observer.	Locality.	Observer.
Caddo, Choctaw Nation	F. C. Meadows.	Okmulgee, Creek Nation	C. C. Belcher.
Muscogee, Creek Nation	Postmaster.	Vinita, Cherokee Nation	W. G. Nelnes.
Oak Lodge, Choctaw Nation	C. H. Patterson.		

In IOWA the Sparrow was reported present in the autumn of 1886, at the following places:

Locality.	First appeared.	Observer.
Ackley	1886	W. Francis.
Agency	1884	E. T. Sage.
Albia		F. M. Milliken.
Allerton	1885	J. H. Jaques.
Bedford	1883†	A. J. Sowers.
Bellevue	1876	Dr. Lawrence Millar.
Bloomfield	188[illegible]†	H. C. Evans.
Burlington		D. Y. Overton.
Do	1869†	Howard Kingsbury.
Cedar Rapids	1874†	Alex. Charles.
Chariton		C. C. Simmons.
Do	1883†	Thomas Spencer.
Clarinda	1876	H. E. Tomlinson.
Coralville	1885	John Thos. Paintin.
Corydon	1884	J. S. Whittaker.
Creston	1884†	S. R. Davis.
Davenport	1870	Davenport Academy Natural Sciences.
Denmark	188[illegible]†	G. B. Brackett.
Des Moines		James B. Green.
Do	1884†	Dr. E. M. Morrison.
Do	1885	George H. Nichols.
Do	1884	C. R. Keyes.
De Witt	1882	J. D. Bourne.
Dubuque	1876	Edward T. Keim.
Do	1879	A. F. Hofer.
Do	1878†	Theo. W. Ruete.
Dyersville	1883	R. W. Gadsden.
Eldridge	1875†	M. H. Calderwood.
Fairfield		Thomas C. Ross.
Farley	1882†	W. V. Oldridge.
Ferry		F. Eveland.
Glenwood	1881†	Theo. W. Ivory.
Grinnell	1884	John Houghton.
Do		Lynds Jones.
Do	1881	Carl Kelsey.
Guttenberg	1880	James Schroeder.
Hamburgh	1881	Sidney Moor.
Hampton	1886	J. B. Peck.
Independence	1883	David Dorman.
Iowa City		H. L. Bond.
Do	1881†	C. C. Nutting.
Knoxville	1883†	George K. Cherrie.
Lenox	1886	A. C. Brice.
Lost Nation	1881†	F. M. Frazier.
Lyons	1880†	M. H. Westbrook.
Maquoketa	1880	F. W. Crane.
Marengo	1885	A. J. Morrison.
Marshalltown	1883	Max Kruskopf.
Monticello	1883†	P. O. Babcock.
Montrose		Thomas Ward.
Morning Sun	1884	W. A. McCormick.
Moulton	1884	J. M. Willett.
Muscatine	1878†	James J. Russell.
Newton	1884	W. E. Dingman.
Osage	1886	F. W. Annis.
Do	1886†	S. B. Chase.
Oskaloosa	1884†	B. F. Lindly.
Do	1881	Gid. B. McFall.
Ottumwa	1880	D. C. Beaman.
Do		F. M. Milliken.
Parkersburgh	1886	N. G. Baker.
Red Oak		Jacob L. Bake.
Do	1883†	H. E. Deemer.
Shenandoah	1885	J. R. Ratekin.
Sidney	1881†	G. V. Swearingen.
Solon	1884	C. H. Shircliff.
Vail	1884†	M. J. Casey.
Vinton	1882†	S. D. Redfieid.
Wapello	1882†	L. M. Jamison.
Waukon	1886	E. M. Hancock.
Do	1886	D. W. Reed.
West Liberty	1877†	Dr. E. H. King.
Winthrop	1885	M. A. Chamberlain.
Wolcott	1882	L. Bunnewitz.

† About.

It was reported not present at the following places in Iowa:

Locality.	Observer.
Albion	Postmaster.
Alton	H. A. Lieb.
Altoona	W. H. Tompkins.
Ames	Prof. Herbert Osborn.
Andrew	C. W. Long.
Aplington	C. J. Fitzpatrick.
Arcadia	Postmaster.
Avoca	A. P. Cramer.
Battle Creek	Postmaster.
Bayard	Elmer S. Shannon.
Beacon	Mary Salisbury.
Blairstown	Carrie Applegate.
Boone	John A. Hall.
Britt	Postmaster.
Brooklyn	W. T. Sharp.
Butler Centre	H. N. Walker.
Cambridge	J. B. Green.
Centreville	H. C. Haynes.
Charles City	Dr. Joel W. Smith.
Do	T. A. Hand.
Coin	Postmaster.
Colfax	S. V. Wilson.
Conwa	R. A. Holland.
Correctionville	Postmaster.
Dakota	Do.
Dayton	Do.
Decorah	John Finn.
Defiance	Postmaster.
Denison	Do.
De Soto	E. C. Payne.
Eagle Grove	Postmaster.
Earling	J. H. Kuhl.
Early	Postmaster.
Eldora	M. W. Moir.
Elkader	D. G. Griffith.
Elwood	S. H. Clark.
Emmetsburgh	Postmaster.
Epworth	Do.
Essex	Do.
Estherville	Do.
Exira	Do.
Farragut	S. J. Beach.
Ferry	F. Eveland.
Fletcher	W. H. Mong.
Fontanelle	Postmaster.
Forest City	Martin Cooper.
Fort Dodge	Mr. Rain.
Garnavillo	Theo. J. Krasinsky.
Gilman	J. H. Seages.
Gilmore City	F. E. Beers.
Grand Junction	Tenny Smith.
Greene	Postmaster.
Greenfield	Paul Dowlin.
Guthrie Centre	Postmaster.
Harlan	B. I. Kinsey.
Hawarden	J. C. Miller.
Homestead	William Moershel.
Hull	Edward O. Plumbe,

Locality.	Observer.	Locality.	Observer.
Ida Grove	George S. Witters.	Peterson	Postmaster.
Imogene	Postmaster.	Pocahontas	J. F. Harlan.
Indianola	I. L. Eno.	Pomeroy	William T. Ivey.
Do	F. M. Milliken.	Postville	N. J. Beedy.
Iowa City	Henry N. Berry.	Preston	N. Godes.
Jesup	Postmaster.	Primghar	J. M. Long.
Jewell	Do.	Randolph	Postmaster.
Kellerton	F. C. Smith.	Reinbeck	William E. Fallas.
Lake Mills	Postmaster.	Rockford	C. F. Myers.
Lansing	J. Ruth.	Rock Rapids	Messrs. Pierce & Co.
Le Mars	N. Redmon.	Rock Valley	Postmaster.
Do	J. E. Vogt.	Runnells	Do.
Leon	Postmaster.	Ruthven	Do.
Lewis	V. M. Conrad.	Sac City	J. W. Garrison.
Livermore	Postmaster.	Sanborn	D. R. Phelps.
Logan	J. T. Stern.	Schaller	F. G. Butler.
Lynnville	J. S. Kitch.	Seymour	M. G. Cain.
Macedonia	Postmaster.	Sheffield	W. S. Bowen.
McGregor	A. F. Hofer.	Shellsburgh	Alex. Runyon.
Do	O. A. Kenyon.	Shelby	R. D. Prouty.
Macksburgh	John D. Love.	Sheldon	C. S. M. Laury.
Malvern	R. L. Gidley.	Sibley	A. D. Tinsley.
Marble Rock	C. E. Wood.	Silver City	J. C. Christy.
Mapleton	W. F. Scott.	Sioux Rapids	A. P. Roberts.
Marne	Olof. Reimen.	Sloan	J. S. McSparran.
Mason City	H. Keerl.	Smithland	Postmaster.
Menlo	A. H. Grisell.	Spencer	Do.
Do	R. B. Shaver.	Spirit Lake	John Mosher.
Melrose	James Duggan.	Strawberry Point	P. W. Keith.
Millersburgh	Eli Sweet.	Templeton	Peter Neu.
Minburn	D. C. Bligh.	Unionville	A. Hicks.
Monmouth	L. W. Hubbard.	Urbanna	E. Gee.
Nashua	J. M. Gilliland.	Van Horn	Postmaster.
Nevada	E. D. Fenn.	Victor	W. L. Eckhard.
Nevinville	J. J. Crawford.	Villisca	P. D. Merrick.
New Providence	O. E. Miller.	Wall Lake	R. Pattison.
Northborough	C. P. Greene.	Walnut	W. Hopper.
Oakland	J. A. T. Bates.	Webster City	Charles Aldrich.
Odebolt	F. R. Bennett.	Wesley	Postmaster.
Onawa	F. P. Fisher.	West Point	John Kempker, jr.
Do	C. G. Perkins.	Westside	L. Scofield.
Orange City	W. H. Cusady.	Whittemore	H. P. Hatch.
Panora	Postmaster.	Wiota	A. S. Raber.
Persia	James Laing.	Woodbine	L. W. White.
Perry	D. C. West.	Worthington	Postmaster.

In KANSAS the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Abilene	1884	H. H. Floyd.	Fort Riley	1886†	John D. Parker.
Do	1875[?]	Prof. Jno. W. Robson.	Fort Scott	1885	J. F. Cottrell.
Arvonia	1882	Postmaster.	Frankfort	1880	Postmaster.
Baker	1883	Do.	Fulton	1881†	D. C. Johnston.
Baldwin City	1885	Do.	Garnett	1882	J. S. McCartney.
Beattie	1881	Do.	Do	1885	M. A. Page.
Blaine	1878†	Do.	Greeley	1886	Postmaster.
Bronson	1884	A. Ford.	Grenola	1883	Thos. B. Hatcher.
Burlingame	1871	J. Mayberry.	Havensville	1883†	L. W. Dennen.
Burlington	1883	Patrick W. Floyd.	Hiawatha	1880	H. C. Baker.
Cedar Point	1884	William M. Doughty.	Highland	1884	Wesley Trevett.
Chanute	1886	S. H. Scott.	Hillsboro	1885	John G. Hill.
Cherryvale	1884	Postmaster.	Iola	1885	Altes H. Campbell.
Circleville	1882	M. H. Roller.	Larkin	1883	P. C. Sweaney.
Colony	1884	Postmaster.	Lawrence	1877	B. F. Smith.
Cottonwood Falls	1885	W. P. Martin.	Lebo	....	J. D. Ambrose.
Derby	....	Michael Cooke.	Le Roy	1884	A. V. Coffin.
Doniphan	1880†	Postmaster.	Louisburgh	1884	R. A. Wright.
Effingham	1884	J. A. Cohoon.	McPherson	1883†	Warren Knaus.
El Dorado	1883	Postmaster.	Manhattan	1882†	Dr. Chas. P. Blachly.
Elmdale	1882†	James R. Jeffrey.	Do	1880	Prof. D. E. Lantz.
Emporia	1883†	Rev. Henry Mackay.	Marion	1884	Charles Hardcastle.
Enterprise	1875†	Prof. J. W. Robson.	Melvern	1880	R. D. Criss.
Eureka	1884	A. W. Hart.	Morantown	1885	P. J. McGlashan.
Fall River	1884	William McBrown.	Morganville	1885	Postmaster.
Fontana	1886	M. J. Campbell.	Morrill	1884†	A. Cottrell.

† About.

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Neosho Falls	1882†	H. D. Dickson.	Robinson	1883†	James T. Pomeroy.
Netawaka	1886	John H. Johnson.	Severance	1882	E. Heemey.
Olathe	1883	E. P. Diehl.	Solomon City	1875[?]	Prof. Jno. W. Robson.
Do	....	Postmaster. [?]	Spring Hill	1883	S. W. Young.
Omio	1885	Dr. S. P. Morse.	Stafford	1886	G. R. Cruzen.
Oneida	1881	Postmaster. [?]	Strong	1883	J. L. Cochran.
Osage Mission	1885	John R. Brunt.	Tonganoxie	1886	J. S. Grist.
Oskaloosa	1880	A. J. Buck.	Topeka	1874	F. W. Giles.
Do	1881	M. L. Critchfield.	Toronto	1885	J. B. Stockton.
Oswego	1885	D. Doyle.	Vinland	1882	Joseph Iliff.
Do	1885†	Dr. W. S. Newlon.	Westmoreland	1883	J. B. Pierce.
Parkersville	1880	H. S. Day.	Wetmore	1879†	D. C. Rising.
Parsons	1886	F. W. Frye.	Wichita	1885	D. A. Mitchell.
Quenemo	1882	Dr. A. R. Bodley.	Williamsburgh	1883	Postmaster.

† About.

It was reported not present at the following places in Kansas:

Locality.	Observer.	Locality.	Observer.
Alamota	M. S. Ketch.	Lincoln	J. B. Goff.
Alma	Matt Thomson.	Litchfield	W. B. Dennison.
Altamont	Postmaster.	Lyons	George W. Clark.
Altoona	M. Moore.	Do	W. T. Nicholas.
Ashland	M. Milton Bailey.	McPherson*	Theodore Boggs.
Atwood	Postmaster.	Do	B. S. Bonney.
Barclay	David B. Embree.	Mankato	E. P. Bancroft.
Barnes	Postmaster.	Mapleton	E. P. Higby.
Bennington	B. W. Flournoy.	Marquette	J. A. Foster.
Beloit	E. A. Taylor.	Marvin	Postmaster.
Benton	W. H. Litson, jr.	Millbrooke	W. B. Anderson.
Do	Postmaster.	Moline	J. F. Gooch.
Blue Mound	Do.	Monrovia	Thomas F. Cook.
Caldwell	O. Beeson.	Monument	John B. Ennis.
Cawker City	William Whitney.	Mound Valley	Postmaster.
Cedarville	T. W. Rea.	Mulberry Grove	Ada L. Miller.
Cheever	Prof. John W. Robson.	Norton	Walter R. Cannon.
Clay Centre	E. C. Wilson.	Oak Valley	George R. Sater.
Dodge City	F. M. Reemer.	Opolis	Postmaster.
Dorrance	B. J. Rankin.	Osborne	Leroy T. Weeks.
Downs	D. S. Gardiner.	Pittsburgh	Postmaster.
Elk Falls	George Fain.	Plainville	Do.
Eudora	T. C. Darling.	Potterville	W. G. Short.
Farnsworth	George H. Haleman.	Pratt	Postmaster.
Fredonia [1887]	George B. Brown.	Prescott	Do.
Garden Plain	J. S. Gilleest.	Reece	Do.
Garfield	M. W. Elder.	Rush Centre	E. F. Mullay.
Girard	E. A. Wasser.	Russell	F. E. Jerome.
Glasco	Noah Welch.	Scandia	William Walker.
Great Bend	H. P. Bain.	Sedan	D. J. Moore.
Greenleaf	C. E. Howe.	Shermanville	Postmaster.
Hays City	Joseph E. Wilson.	Smith Centre	L. E. Reese.
Hepler	J. T. Didlake.	Solomon City*	D. W. Wilson.
Hunnewell	J. O. Brewster.	South Haven	M. Musgrove.
Hutchinson	E. M. Yoden.	Sterling	J. B. Schlichter.
Industry	A. T. Munroe.	Towanda	A. Swiggett.
Ionia	Herman Colson.	Uniontown	J. U. Moore.
Irving	Postmaster.	Vining	Postmaster.
Iuka	S. W. Taylor.	Wa Keeney	George M. Ufford.
Jetmore	J. W. Winn.	Washington	Postmaster.
Jewell	R. W. Hill.	Waterville	George H. Titcomb
Kinsley	James P. Alcorn.	Wathena	Postmaster.
Kirwin	C. E. Monell.	Weir	J. Morgan, jr.
Larned	S. S. Dickinson.	Westphalia	Postmaster.
Do	Henry Booth.	White Rock	A. B. Warner.
Lenora	T. J. Gilbert.	White Cloud	Samuel Flinn.
Liberty	A. F. Johnson.	Winfield	George C. Pembaugh.

* Reported present by another observer.

In KENTUCKY the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Adairville	....	A. M. Mosely.	Hopkinsville	1881†	John W. McPherson.
Albany	1884	W. L. Stouf.	Inez	1884	N. W. Crum.
Auburn	1878†	I. O. Perkins.	Irvine	1883	June B. Park.
Augusta	1880†	J. H. Boude.	Jamestown	1882	Postmaster.
Bagdad	1879†	E. P. Denton.	La Grange	1879	J. R. Clark.
Barboursville	1880	Thomas H. Amis.	Lancaster	1877†	W. H. Wherritt.
Bardwel	1885	John W. Tusk.	Lexington	1868†	Dr. Robert Peter
Bedford	1883	Leonard G. Peak.	Liberty	1884	Postmaster.
Bloomfield	1868†	John Allan Terrell.	London	1882	R. M. Jackson.
Booneville	1883	Hon. Green Breeding.	Louisa	1876	Mrs. C. C. Sullivan.
Bowling Green [near].	1883†	W. Cook.	Louisville	1874	J. B. Nall.
Bowling Green	1878	Postmaster.	Madisonville	1880	J. F. Dempsey.
Brownsville	1884	Henry E. Smith.	Marion	1882	J. G. Rochester.
Burkesville	1880†	W. F. Alexander.	Maysville	1878†	A. C. Respess.
Burlington	1880†	Postmaster.	Morganfield	....	B. B. Hughes.
Cadiz	1883	G. Smith.	Murray	1880†	W. T. Scott.
Carrollton	1881†	Postmaster.	New Haven	1874†	Dr. H. D. Rodman.
Casky	1886	Frank B. Hancock.	New Liberty	1880†	John Curtis.
Catlettsburgh	1879†	J. C. Rardin.	Newport	....	P. B. Spence.
Clinton	1884	W. C. Porter.	Nicholasville	1878	Postmaster.
Columbus	1883	F. H. Gardner.	Do	....	De Witt C. Shely.
Crescent Hill	1880†	Thomas S. Kennedy.	Paducah	....	W. C. Clark.
Danville	1874	James R. Marrs.	Paintsville	1884	Postmaster.
Dawson	1882	W. D. Halloman.	Pikeville	1884	F. C. Hatcher.
Elizabethtown	....	Postmaster.	Providence	1881	J. A. Rudy.
Elkton	1880†	E. W. Weathers.	Richmond	1879†	Stephen D. Parrish.
Eminence	1882†	Postmaster.	Sandy Hook	1885	L. Haney.
Eubank	1886	John B. Lewis.	Sebree	1884†	John A. Willingham.
Falmouth	1880†	Mrs. M. A. Clark.	Shelbyville	1878†	Dr. Ormsby Gray.
Flemingsburgh	1881	H. C. Ashton.	Shepherdsville	1883	C. C. Lee.
Frankfort	....	C. E. Bowman.	Simpsonville	1879	R. H. George.
Franklin	1882†	T. M. GoodKnight.	Smithland	1880	A. J. Bebout.
Fulton	1883	H. F. Taylor.	Smith's Grove	1882	Postmaster.
Germantown	1880	J. A. Walton.	Somerset	1881†	John Inman.
Ghent	1878†	George R. Bowie.	South Carrollton	1881	J. O. Everly.
Grayson	1877	A. F. Hill.	Stanford	1873	Thomas Richards.
Greensburgh	1881	W. J. Taylor.	Taylorsville	1878†	Ruth C. Burton.
Greenville	1880	C. W. Short.	Tompkinsville	1885	Postmaster.
Hardinsburgh	....	J. R. Johnson.	Trenton	1882†	L. H. Arnold.
Hartford	1880	A. B. Baird.	Vanceburgh	1879†	J. Sparks.
Hawesville	1879†	D. L. Adair.	West Liberty	1884	William M. Kendall.
Hickman	1877	L. O. Pindar.	Williamstown	1876†	Postmaster.

† About.

It was reported not present at the following places in Kentucky:

Locality.	Observer.	Locality.	Observer.
Backusburgh	Henry C. Wade.	Edmonton	J. P. Van Zant.
Bandana	W. L. Bridgewater.	Jackson	W. D. Cardwelt.
Blandville	W. I. Watson.	Salyersville	S. E. Hager.
Crocus	J. P. Miller.	Young's Springs	William H. Caragan.

In LOUISIANA the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Barataria	1883†	William B. Berthoud.	Napoleonville	1884	Dr. Charles Meuville.
Bayou Goula	....	W. C. Percy, jr.	New Orleans	1874†	W. W. Edwards.
Do	1882†	P. L. Viallon.	Plaquemine	1880	Charles E. Dupuy.
Black Hawk	1884	W. C. Percy, jr.	Pointe Coupee	1885	Postmaster.
Donaldsonville	1881	L. E. Bentley.	Port Hudson	1882	Do.
Do	....	Charles E. Nesmith.	Saint Joseph	1886	A. Bondusant.
Edgard	1884	Postmaster.	Schriever	1885	Postmaster.
Hahnville	1881	Joseph W. Carew.	Welcome	....	J. A. Burbank.
Lafourche Crossing.	1886	Postmaster.			

† About.

It was reported not present at the following places in Louisiana:

Locality.	Observer.	Locality.	Observer.
Amite City	Postmaster.	La Fayette	Postmaster.
Arcadia	J. C. Brice.	Lake Providence	J. G. Oldfield.
Arcola	J. M. Hills.	Do	F. H. G. Taylor.
Baldwin	Charles A. Bibbins.	Lamourie Bridge	Postmaster.
Bastrop	J. William Brown.	Leesville	J. O. Winfree.
Bayou Current	Postmaster.	Manifest	R. B. Hodges.
Bayou Sara	F. M. Mumford.	Many	J. B. Vandagaer.
Bellevue	J. H. Cabeen.	Marksville	H. Dupuy.
Cameron	S. P. Henry.	Minden	J. C. T. Chaffe.
Centreville	A. B. Etienne.	Morgan City	H. M. Mayo.
Church Point	P. L. Guidry.	Monroe	I. Garrett.
Colfax	A. L. Grow.	Mound	C. H. Lucas.
Convent	Joseph Blandig.	Natchitoches	E. Suddath.
Coushatta	J. R. McGoldrick.	Newellton	Louis Buckner.
Delhi	R. H. Dollerhide.	Pattersonville	Postmaster.
Dennis Mills	Thomas F. Anderson.	Port Eades	W. L. Wright.
English Lookout	D. L. Green.	Port Vincent	D. C. Leftwich.
Farmersville	I. Shelsten.	Rayne	Alphonse Duclos.
Foster	J. E. Munson.	Robeline	James M. H. McCook.
Franklin	John A. O'Niell.	Ruston	Postmaster.
Frierson's Mill	C. J. Frierson.	Saint Martinville	Albert Bienvenu.
Harrisonburgh	John H. Carter.	Shreveport	George D. Alexander.
Homer	D. W. Harris.	Sparta	H. F. Scheen.
Houma	P. Ulmer.	Tallulah	O. P. Hebert.
Jackson	Lee Kiblinger.	Tigerville	Postmaster.
Jennings	Postmaster.	Water Proof	Myles Bonney.
Jewella	Do.	Winnsborough	S. Wylie.
Keatchie	William G. Spilker.		

In MAINE the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Bangor		F. P. Briggs.	North Livermore	1883	George H. Berry.
Bath		George E. Newman.	Ogunquit	1882†	Daniel W. Perkins.
Belfast	1883	George E. Brackett.	Orono	1881	Prof. C. H. Fernald.
Brewer	1884†	Manly Hardy.	Portland	1858	Nathan C. Brown.
Calais	1883†	George A. Boardman.	Do		Charles B. Fuller.
China	1884	Dr. G. A. Martin.	Do	1876†	C. P. Mattoch.
Damariscotta	1883	E. W. Dunbar.	Do	1858	Everett Smith.
Dexter		J. D. Cochrane.	Presque Isle		John Stewart.
Fairfield	1876†	Jas. O. Whittemore.	Readfield	1886	H. O. Nickerson.
Farmington	1880†	E. E. Richards.	Saccarappa		Arthur H. Norton.
Houlton		John Stewart.	South Windham		C. K. Allen.
Lewiston	1882	W. R. Wright.	Waterborough		C. W. Costellow.

† About.

It was reported not present at the following places in Maine:

Locality.	Observer.	Locality.	Observer.
East Surry	Samuel Warson.	Skowhegan	A. R. Smiley.
Hudson	F. P. Briggs.		

In MARYLAND the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Annapolis		F. K. Steele.	Mechanicstown	1877†	E. L. Boblitz.
Baltimore		Otto Lugger.	Middletown	1878	E. M. Bowlus.
Boonsborough	1875†	Robert Lamar.	New Windsor	1876†	J. F. Buffington.
Burkittsville	1879†	William C. Karn.	Oakland	1875†	P. Hamill.
Clear Spring	1876†	L. Peterman.	Salisbury	1880	E. Stanley Toadvin.
Cumberland	1868	A. Willison.	Sandy Spring	1880†	Henry C. Hallowell.
Emmitsburg	1879†	S. N. McNair.	Do	1879†	H. H. Miller.
Frostburgh	1878†	C. H. Walker.	Sharpsburgh	1878†	Henry M. Johnson.
Grantsville	1880	George P. Thistle.	Smithsburgh	1876†	Manoah Metz.
Hagerstown	1876†	W. T. Swartz.	Taneytown	1876†	J. A. Briechner.
Hancock	1865	S. C. Crown.	Union Bridge	1877†	Edward W. Leeds.
Lonaconing	1878†	Patrick Carroll.	Westminster	1876†	Joseph B. Boyle.
Manchester	1872†	Adam Shower.	Williamsport	1870	S. R. Wolf.

† About.

In MASSACHUSETTS the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Amherst	1872†	Hubert L. Clark.	Newton Highlands.		James F. C. Hyde.
Boston		Joseph M. Wade.	New Worcester	1874†	Theo. G. Ball.
Brookline	1868	N. A. Francis.	Norfolk	1883†	L. C. Keith.
Do		Gordon Plummer.	North Adams	1880	Nelson Dupuy.
Cambridge	1874†	William Brewster.	Northampton	1875†	L. C. Ferry.
Do	1873†	Dr. H. A. Hagen.	Rehoboth	1879	F. H. Carpenter.
Cottage City	1882†	F. P. Vincent.	Siasconset	1880†	P. M. Almy.
Cuttyhunk		Alonzo Daggett.	Somerset	1874	Elisha Slade.
Dracut	1883	Asa Clement.	Spencer	1875†	Clarence L. Cate.
East Templeton	1880	Charles E. Ingalls.	Springfield		J. W. Adams.
Edgartown	1884†	Henry A. Pease.	Do	1866†	George A. Solly.
Falmouth	1882†	F. J. C. Swift.	Do	1876†	Dr. P. L. B. Stickney.
Fitchburg	1872†	Prof. F. E. L. Beal.	Taunton	1878†	Charles H. Andros.
Holyoke	1870†	Thomas Chalmers.	Do	1878	John C. Cahoon.
Do		William F. Lamb.	Tyngsborough		C. W. Swallow.
Do		F. H. Metcalf.	Vineyard Haven	1884†	John F. Robinson.
Lynn	1873†	Waldo Thompson.	Westford	1883†	L. W. Wheeler.
Do		John B. Tolman.	West Roxbury	1876†	C. A. Hewins.
Medford	1869†	John Ayres.	West Springfield.	1880†	J. N. Bagg.
Middleborough	1875†	E. A. Bowen.	Woburn	1875†	E. H. Richards.
Nantucket	1882†	J. F. Murphey.	Wood's Holl	1884	J. H. Kidder.
Newton	1877†	J. W. Pearson.			

† About.

It was reported not present at the following places in Massachusetts:

Locality.	Observer.	Locality.	Observer.
Gay Head	Wm. A. Vanderhoop.	Spencer [country]	H. H. Kingsbury.
Halifax	G. A. Parker.	West Tisbury	C. W. Nickerson.
Royalston	Miss M. E. Paine.		

In MICHIGAN the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.
Ada	1884	Postmaster.
Agricultural College.	1885	A. J. Cook.
Do	....	Professor of botany and forestry.
Albion	1885	Martin Haven.
Allegan	....	Rev. D. D. Chapin.
Allen	1878	John H. Parish.
Alma	....	T. D. Ely.
Almont	1878†	F. C. Andrus.
Alpena	....	William Boulton.
Ann Arbor	....	J. B. Steere.
Athens	1876†	J. F. Culp.
Bad Axe	1882	Bell Irwin.
Do	1883	J. T. Rorick.
Baldwin (1888)	....	Robert J. Matthews.
Bay City	1879	F. W. Grinnell.
Bear Lake	1883†	John N. Brodie.
Bellaire (1888)	....	A. S. Abbott.
Benzonia	1885†	Edson Packard.
Berrien Springs	1883	Fremont D. Nichols.
Big Rapids	1878†	J. T. Escott.
Boyne City	1883	Walter Ware and Jas. L. Campbell.
Boyne Falls	1885	Monroe Dickinson.
Buchanan	1871†	J. L. Richards.
Burdickville	1884	A. S. Fritz.
Burlington	1883	Postmaster.
Caledonia Station.	1884	Kate Konkle.
Cassopolis	1881†	L. H. Glover.
Centreville	1879	J. A. Russell.
Charlotte	1875	C. S. Barrett.
Cheboygan	1882	C. A. Gallagher.
Clare	....	A. C. Aldrich.
Coldwater	1876	David B. Dennis.
Concord	1884	David E. Haskins.
Corunna	1881	Dr. C. T. Armstrong.
Detroit (1888)	....	Ralph Phelps, jr.
Dorr	1885	Frank Sommer.
Eaton Rapids	1881†	S. R. Fuller.
Elk Rapids	1880	James E. Rankin
Escanaba	1876	T. Killian.
Evart	1882	W. L. Stoddard.
Farmington	....	Frank D. Clark.
Farwell	1885	Postmaster.
Fife Lake	1883	Do.
Frankfort	1881†	Charles Burmeister.
Do	1882	Wm. G. Voorheis.
Gaines Station	1876	N. P. Seeland.
Galien	1882	G. A. Blakeslee.
Gladwin	1884	Postmaster.
Grand Haven	1871†	Do.
Grand Rapids	1885	James Cox.
Do	1881†	Charles W. Garfield.
Grass Lake	....	Frank O. Hellier.
Grayling	1882	J. O. Hadley.
Greenville	....	J. E. Taylor.
Harbor Springs	1882	Will E. Hampton.
Harrison	1884	William W. Green.
Do	....	Postmaster.
Harrisville	1880	Do.
Hart	....	E. T. Mugford.
Do	1882	E. D. Richmond,
Hartford	1879†	Edward Finley.
Hastings	1876	John Bessmer.
Hillman	1883	Postmaster.
Hillsdale	1874	Ira B. Card.
Holland	1882	William Verbeck.
Homer	1878	C. F. Collins.
Hopkins' Station.	1883	Postmaster.
Hudson	1875	A. H. Boies.
Huron	1885	Andrew Shaw.
Imlay City	1883	E. J. Landers.
Ithaca	1878	O. F. Jackson.
Ithaca	1882	H. Morrison.
Jackson (1884)	1880†	William K. Gibson
Do ...do	1876†	P. B. Loomis.
Do ...do	1874†	Grove H. Wolcott.
Jonesville	1884	R. J. Coryell.
Kalamazoo	1876†	Dr. Morris Gibbs.
Do	1878†	Frank Little.
Kent City	1882	Henry H. Wylie.
Kingsley	1885	A. G. Edwards.
Lansing	....	Jason E. Nichols.
Lapeer	1879†	Fred S. Odle.
Lenawee Junction.	1871†	M. Graves.
Lickley Corners.	1885	A. H. Carver.
Locke	1882	Dr. H. A. Atkins.
McMillan	....	D. L. West.
Manistee (1888)	....	Robert Johnson.
Manistique	1884	W. H. Hill and Corwin Adkins.
Marquette	....	W. W. Dent.
Do	1885†	Frank E. Wood.
Marshall	1880	Samuel S. Lacey.
Martin	1884	George Redpath.
May	1882	O. A. Myers.
Mears	1883	George Wyckoff.
Menominee	1882	J. W. Bird.
Merrill	1883	Postmaster.
Midland	1884	H. L. Fairchild.
Do	1878[?]	Postmaster.
Millet	1884	L. E. Crane.
Monroe	1873†	James C. Critchett.
Morenci	1878	Henry S. Wyman.
Mount Clemens.	1883	John B. Leonardson.
Muskegon (1888)	....	Martin Waalkes.
Nashville	1876	James M. Pilbeam.
New Haven	....	John Leonardson.
North Adams	1881	O. C. Smith.
North Branch	....	R. A. McDougall.
Northville	1880	Dean F. Griswold.
Nunica	1881	J. J. Wiseman.
Omer	1885	J. H. Delknap.
Oscoda	1879	H. C. King.
Otisville	1880†	Postmaster.
Owosso	1876	A. Lee Williams.
Paw Paw	1874	Postmaster.
Perry	1881	Do.
Petersburgh	1877†	Jerome Trombley.
Pinckney	1878	Postmaster.
Pittsford	....	Do.
Plainwell	1874†	A. C. Roberts.
Plymouth	1876	W. J. Burrow.
Portland	1880†	F. M. Cutcheon.
Reading	1881	H. F. Doty.
Reese	1878	John J. Gies.
Richmond	....	E. F. Hunt.
Rogers City (1888).	1885†	Hermann Hoeft.
Saginaw	1881†	F. S. Smith.
Saint Clair	1876†	T. D. Barron.
Saint John's (1888).	....	James H. Conn.
Saline	1880	Norman A. Wood.
Sand Hill	....	Wm. J. Muldragh.
Sandusky	1883	Thomas Doyle.
Sandusky (1888)	....	Chris. Murphy.
Saranac	1879	M. S. Lord.
Saugatuck	1880	Postmaster.
Sault de Ste. Marie.	1883	William S. Shaw.
Schoolcraft	1877†	P. D. Miller.
Shelby	1880	Geo. W. Woodward.
Sherwood	1884†	Postmaster.
Sparta	1880	E. Bradford.
Springport	....	J. B. Conklin.
Stanton	1881†	Postmaster.
Tawas City	1882	Do.

† About.

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Tecumseh	1879	C. A. Wright and C. A. Story.	Watrousville	1882	E. B. Hayes.
			Wayland	1882	John Graves.
Thomson	1876[?]	R. B. Wallace.	West Bay City	1881	Postmaster.
Thornville	1882	Dr. John S. Caulkins.	West Windsor	1884	Mary E. Tuttle.
Traverse City	1878	H. D. Campbell.	White Cloud	1883	R. S. Trask.
Utica	1881	Samuel P. St. John.	Whittemore	1883	Frank Duplanty.
Vassar	1876†	Levi H. Emerson.	Wixom	....	Postmaster.
Watervliet	1882	W. E. Walden.	Ypsilanti	1880†	William Lambie.

† About.

It was reported not present at the following places in Michigan:

Locality.	Observer.	Locality.	Observer.
Atlantic Mine	Postmaster.	Michigamme	Postmaster.
Baldwin	Andrew Ozmun.	Munising*	W. A. Cox.
Calumet	A. T. Streeter.	Newberry	T. J. Stewart.
Camden	J. B. Alward.	Ontonagon	Asa A. Parker.
Crystal Falls	Postmaster.	Quinnesec	Postmaster.
Hancock	James B. Looney.	Republic	John Maguire.
Houghton	E. R. Penbentry.	Ripley	Frank E. Wood.
Iron Mountain	Postmaster.	Rives Junction	John Heffeman.
Lake City	F. O. Gaffney.	Saint Ignace	R. W. Hornbach.
Lake Linden	Postmaster.	Saint James	James R. Gibson.
L'Anse	John Q. McKernan.		

*Reported present in 1887.

In MINNESOTA the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Austin	1886	H. O. Bayard.	Redwood Falls	1881†	J. L. Thompson.
Do.	1885	G. L. Case.	Rochester	1886	Samuel De Wolf.
Chatfield	1884	John R. Jones.	Do.	1886	W. D. Hurlbut.
Elk River (1887)	1886	Vernon Bailey.	Saint Paul	1876	Dr. Thos. S. Roberts.
Lanesborough	1886	Dr. J. C. Hvoslef.	Wabasha	1886	J. H. Evans.
Minneapolis	1876	Dr. P. L. Hatch.	Waseca	1886	D. McLaughlin.
Do.	1876	Dr. Thos. S. Roberts.	Winona	1886†	Prof. J. M. Holsinger.
Monticello	1882	William Tubbs.	Do.	1886	Postmaster.

† About.

It was reported not present at the following places in Minnesota:

Locality.	Observer.	Locality.	Observer.
Albert Lea	R. B. Abbott.	Cloquet	Hamilton Curry.
Anoka	J. A. Foote.	Detroit City	S. N. Horneck.
Aitkin	E. F. Barrett.	Duluth	John Flynn.
Atwater	Marcus Johnson.	Elk River*	H. P. Burrell.
Audubon	George Wendel.	Excelsior	Dr. James R. Walker.
Beaver Falls	J. Leon Wieland.	Fairmont	A. L. Ward.
Belle Plaine	E. E. Chatfield.	Farmington	Hamilton H. Judson.
Benson	John D. Lyons.	Fort Snelling	Victor Roberson.
Bird Island	F. L. Puffer.	Glenwood	Thomas Schweiger.
Blue Earth City	J. H. Sprout.	Glyndon	J. W. Rodgers.
Breckenridge	H. Champion.	Granite Falls	C. A. Bennett.
Do	George F. Cook.	Hallock	William Thompson.
Brownsville	A. L. Darling.	Hamline	E. B. Higgins.
Buffalo	J. C. Nugent.	Hastings	Rev. George B. Pratt.
Carver	Charles Johnson.	Helena	George Beekman.
Centre City	Postmaster.	Henderson	Adam Buck.
Chaska	George F. Taber.	Houston	S. B. McIntire.

*Reported present by another observer.

Locality.	Observer.	Locality.	Observer.
Howard	Mark Fosket.	Osseo	William Krueger.
Iona	Martin W. Donnell.	Owatonna	L. L. Wheelock.
Jackson	John Feildes.	Oxford	Stephen Hewson.
Jordan	Michael Beck.	Perham	Henry Kemper.
Kasson	George B. Arnold.	Pipestone	D. E. Sweet.
Kimberly	M. F. Showell,	Preston	Thomas Hall.
La Crescent	John S. Harris.	Princeton	Newell A. Ross.
Do	Thomas Minshall.	Richfield	J. N. Richardson.
Lake City	David O. Irwin.	Rush City	P. McKeon.
Do	George H. Selover.	Do	H. P. Robie.
Lake Crystal	M. W. Kelly.	Rushford	D. F. Murphy.
Lake Park	C. Bjorge.	Saint Charles	John Pickert.
Lakeville	C. H. French.	Saint Cloud	Postmaster.
Le Sueur	I. M. Farmer.	Saint Paul*	D. L. Kiehle.
Do	E. R. Smith.	Saint Peter's	Charles A. Johnson.
Litchfield	A. J. Revill.	Sauk Centre	Charles F. Hendryx.
Long Lake	B. F. Christlieb.	Sauk Rapids	Julia A. A. Wood.
Luverne	C. O. Hawes.	Shakopee	Charles Bornarth.
Madelia	A. H. Benton.	Stillwater	E. G. Butts.
Mankato	James Cannon.	Taylor's Falls	N. W. Humphrey.
Marine Mills	Charles Westergren.	Tower	John Anderson.
Marshall	Squire D. How.	Tyler	J. A. Bigham.
Mendota	T. Fee.	Verndale	E. E. Parker.
Merriam Junction	Henry Dols.	Warren	A. P. McIntire.
Minnetonka	D. M. Burwell.	Washburn	Frederick Miller.
Montevideo	E. L. Kempe.	Wells	J. W. Polleys.
Moorhead	E. Fay.	White Bear Lake	Daniel Getty.
Mora	Stanton D. Seavey.	Willmar	O. Selvig.
New Ulm	Francis Baasen.	Windom	S. M. Espey.
Norcross	Postmaster.	Do	S. B. Stutman.
North Star	John Schrooten.	Winnebago	A. B. Davis.
Oak Dale	Joseph Streiff.	Worthington	L B. Bennett.
Olivia	Daniel Haire.	Zumbrota	C. B. Anderson.

*Reported present by another observer.

In MISSISSIPPI the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared	Observer.
Aberdeen	1884†	M. H. Gillespie.	Hernando	1872†	D. M. Slocumb.
Do	1883	A. A. Wall.	Holly Springs	1882†	John S. Finlay.
Booneville	1884†	R. E. Marshall.	Iuka	1884	A. T. Scruggs.
Coffeeville	1884†	J. F. Kelly.	Natchez	1886	R. Holmes.
Columbus	1883†	Dayton Hale.	Ripley	1884	E. W. Simpson.
Do	1884†	D. C. Hodo.	Senatobia	1881†	C. P. Varner.
Corinth	1884	Postmaster.	Starkville	....	W. B. Stark.
Do	....	Dr. Rawlings Young.	Tupelo	1886	F. M. Goar.
Friar's Point	1878†	F. D. Robinson.	West Point	1880	J. H. Brinker.
Grenada	1881†	R. N. Hall.	Winona	1883†	D. S. Young.

† About.

It was reported not present at the following places in Mississippi:

Locality.	Observer.	Locality.	Observer.
Agricultural College	W. B. Stark.	Magnolia	E. Safford.
Austin	T. W. L. Askew.	Mississippi City	C. Phelps.
Baldwyn	T. B. Stubbs.	Monticello	W. F. McInnis.
Bay Saint Louis	Ella E. Ioor.	Morton	L. R. Moore.
Belen	F. M. Hamflet.	Moss Point	A. Blumer.
Bollinger's Mills (1885)	Jos. H. Grant.	Do	C. H. Wood.
Bolton's Depot	M. Allie Davis.	Muldon	J. C. Cunningham.
Brookhaven	V. L. Tyler.	Pass Christian	Howard P. Beeman.
Canton	G. W. Thomas.	Pontotoc	Samuel Miller.
Carrollton	M. E. Love.	Poplarville	R. L. Ratliff.
Clinton	T. G. Rice.	Port Gibson	Mrs. O. A. Hastings.
Columbia	Thaddeus Boemer.	Quitman	E. E. West.
Duncansby	W. F. Westcott.	Raleigh	George W. Currie.
Edwards	R. H. Smith.	Rodney	Gideon Mabbett.
Enterprise	M. E. Byrne.	Rolling Fork	S. W. Langford.
Forest	Hi Eastland.	Rosedale	T. R. McGuin.
Gloster	T. L. Hoff.	Summit	R. P. Godbold.
Hattiesburgh	D. M. Carter.	Terry	W. M. Bracey.
Jackson	Wirt Adam.	Utica	H. J. Sarrett.
Johnsonville	John R. Baird.	Vicksburg	William Groome.
Jonestown	C. Barnes.	Do	F. M. Webster.
Kosciusko	R. Boyd.	Waynesborough	O. K. Williams.
Leakesville	Daniel McLeod.	Wesson	Kate Bostwick.
Lee	Lehman Colin.	Williamsburgh	C. M. Edmonson.
McComb	C. S. Kellogg.	Woodville	W. A. Elder.
Macon	T. J. Stokes.		

In MISSOURI the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Albany	1883	F. M. Setzer.	Jefferson City	1873†	William G. McCarty.
Aurora Springs	1885†	M. D. Wright.	Kansas City	1883†	George M. Shelley.
Billings	....	M. T. Russell.	Kearney	1885†	P. D. Anderson.
Breckenridge	1886	J. T. Alexander.	Kirksville	1883	George T. Spencer.
Brookfield	1883†	C. W. Freeman.	La Belle	1882†	R. A. Bagby.
Brunswick	1881†	J. S. Wallace.	Lexington	1886	Dr. J. B. Alexander.
Burlington Junc.	1886	S. J. Butcher.	Louisiana	1877†	Thomas W. Lock.
Butler	1886	Harvey Clark.	Macon City	1885	F. A. Dessert.
Do	1882†	Henry Speer.	Marshfield	1886	Oliver Wells.
Cape Girardeau	1880	Henry A. Astholz.	Memphis	1883	J. P. Craig.
Do	1881†	S. S. Harris.	Mexico	1876	John Saunders.
Carrollton	1884†	M. R. Gittings.	Montgomery Cty	1883†	Irvin P. Powell.
Central	1878†	H. M. Snow.	Mt. Carmel	....	Mrs. M. Musick.
Chamois	1884	B. L. Hull.	Nevada	1884	Henry Shepley.
Charleston	1882	G. W. Martin.	New Haven	1880†	C. T. Murphy.
Chillicothe	1876	B. B. Smith.	New London	1884†	J. D. B. Freeman.
Clinton	1885	S. D. Garth.	Oregon	1882†	William Kaucher.
Columbia	1882†	Eli Hodge.	Palmyra	1876	E. A. McLeod.
Craig	1884†	J. H. Williams.	Paris	1882†	James S. McGee.
Denver	1885	Willis Marrs.	Perryville	1881†	Joe R. DeLassus.
De Soto	1884†	James W. Clarke.	Poplar Bluff	1886†	Jesse Reynolds.
Dixon	1884	W. W. Howard.	Potosi	1884	John Teasdale.
Elsberry	1885	J. W. Bibb.	Queen City	1883†	J. R. Brown.
Fairmont	1885	Henry J. Hewitt.	Rich Hill	1885†	Lee Beall.
Farmington	1885	Willard Roriden.	Rolla	1884	H. S. Herbert.
Fayette	1885†	C. J. Walden.	Ste. Genevieve	1883†	Augustine Menard.
Fulton	1883†	J. E. Watson.	Saint Joseph	1881	John C. Evans.
Glenwood	1885	Thomas Peury.	Saint Louis	....	Estill McHenry.
Hartville	1880†	Andrew J. Farmer.	Sedalia	....	F. A. Sampson.
Hermann	1874	Gustav Ettmueller.	So. Saint Louis	1874†	V. Spindler.
Holden	1883†	John D. Crisp.	Trenton	1884†	W. O. Garvin.
Independence	1881†	William Groesbeak.	Weston	1881	Edw. J. Breen.
Ironton	1884†	John F. T. Edwards.	Westport	1885	L. A. Goodman.
Jefferson City	1883	W. E. Coleman.	West St. Louis	1876	John Carroll.

† About.

It was reported not present at the following places in Missouri:

Locality.	Observer.	Locality.	Observer.
Advance	David C. Flynn.	Granby	George A. Sweet.
Appleton City	James Hodkins.	Green Castle	H. T. Jones.
Ash Grove	Henry R. Hall.	Greenridge	James S. Ream.
Austin	William Shields.	Indian Springs	R. W. Williams.
Ava	M. C. Reynolds.	Jamesport	C. E. Orcutt.
Bethany	G. L. Phillips.	Lamar	John H. Douglas.
Bolivar	C. W. Furman.	Lebanon	R. J. Wickersham.
Buffalo	John George.	Linn Creek	C. P. Churchill.
Cabool	George F. Pettigrew.	Lincoln	Fred Brill.
Carthage	G. Blakney.	Malden	W. H. Shelton.
Do	Z. T. Russell.	Malta Bend	A. G. Bailey.
Cassville	T. D. Steele.	Marionville	R. B. Gillette.
Clarksburgh	A. M. Moles.	Maysville	Henry E. Glazier.
Coffeysburgh	J. R. Cunningham.	Moundville	L. H. Orndorff.
College Mound	B. D. Singleton.	New Madrid	Charles A. Loforge.
Cuba	A. U. Farrow.	Purdy	Wash. E. Smith.
Dadeville	Joseph W. Tohim.	Richmond	S. F. Bassett.
Doniphan	J. A. Ferguson.	Salem	Postmaster.
El Dorado Springs	John W. Selby.	Springfield	D. S. Holman.
Forsyth	H. C. Everett.	Do	W. H. Pipkin.
Fredericktown	A. A. Deguire.	Unionville	Alex. Elson.
Galena	S. A. Carr.	Versailles	James B. Spurlock.
Glenwood*	H. D. B. Cutler.	West Plains	Samuel Risley.
Golden City	J. Poore.		

*Reported present by another observer.

In MONTANA, in the autumn of 1886, the Sparrow was known to be present at but one point. Mr. J. R. Widmyer states that it appeared at Glendive in 1885. It was reported not present, in the autumn of 1886, at the following places in Montana:

Locality.	Observer.	Locality.	Observer.
Augusta	P. A. Manix.	Maiden	William Maurer.
Billings	T. Whitney.	Miles City	John McAusland.
Bozeman	R. P. Menefee.	Missoula	Joseph S. Booth.
Butte City	W. Egbert Smith.	Park City	Alice A. St. John.
Dillon	P. E. Poindexter.	Phillipsburgh	John W. Dawson.
Fort Assinaboine	R. L. McCulloh.	Radersburgh	E. M. Batchelder.
Fort Custer	Theodor Borup.	Sheridan	R. P. Bateman.
Fort Shaw	J. H. McKnight.	Townsend	William Wood.
Glendale	E. O. Hulszir.	Virginia	Mary Deimling.
Helena	Charles D. Curtis.	Walkerville	Daniel O'Grady.
Do	William Gibbs.	White Sulphur Springs	J. J. Hennessy.
Livingston	F. W. Wright.		

In NEBRASKA the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Beatrice	1882†	Samuel E. Rigg.	Lincoln	1885†	Albert Watkins.
Bennet	1883	Chas. W. Heffley.	Louisville	....	Thomas W. Shryock.
Blair	1885	W. H. Eller.	Nebraska City	....	Thomas Morton.
Blue Hill	....	Edgar Hilton.	Omaha	1876†	Charles K. Coutant.
Brownville	1882†	R. T. Rainey.	Palmyra	1884†	T. W. Foster.
Central City	1886	John C. Logue.	Papillion	1885	J. P. Spearman.
Grand Island	1883†	C. L. Howell.	Plattsmouth	1874†	J. N. Wise.
Hardy	1886	William M. Peebler.	Sterling	1881	Charles C. Wilson.
Hastings	1885	G. J. Evans.	Talmage	1884	H. Bord.
Humboldt	1884†	J. F. Walsh.	Tecumseh	1882	C. M. Wilson.
Lincoln	1885	Prof. C. E. Bessey.			

† About.

It was reported not present at the following places in Nebraska:

Locality.	Observer.	Locality.	Observer.
Ainsworth	O. B. Ripply.	Kearney	E. R. Watson.
Albion	H. Rice.	Lee Park	J. L. H. Knight.
Alma	C. W. Stewart.	Linwood (1885)	W. J. Kingsbury.
Arapahoe	Thomas B. McPherson.	Long Pine	C. R. Glover
Atkinson	Willard A. Wheeler.	Loup City	Cyrus M. Walworth.
Aurora	John Tweedy.	Madison	Dr. F. A. Long.
Bazile Mills	G. W. Harper.	Minden	W. T. McGinnis.
Bradshaw	Eugene Shallenberger.	Do	J. L. McPheely.
Broken Bow	I. T. Merchant.	Neligh	W. C. Estes.
Carleton	W. T. Shawha	Nemaha City	R. J. Skeen.
Central City*	S. L. Wiser.	North Platte	Adam Furguson.
Clay Center	Mrs. S. Cruickshank.	O'Neill City	James Miller.
Do	Harry B. Strong.	Osceola	A. C. Shallenberger.
Clearwater	Marcus N. Palmer.	Plainview	Ben Stetson.
Columbus	W. N. Hensley.	Ponca	I. Conner.
Cozad	Samuel W. Schooley.	Do	J. W. Radford.
Crete	T. A. C. Beard.	Red Cloud	A. S. Marsh.
Culbertson	B. Cleven.	Saint Paul	C. E. Forbes.
Dakota	Henry Herweg.	Schuyler	J. F. Woods.
David City	F. E. Wilson.	Scotia	L. J. Traynor.
Fairbury	Will. W. Watson.	Seward	John S. Kittle.
Falls City	W. R. Crook.	Sidney	William J. Breeman.
Fullerton	E. G. Cook.	Wahoo	L. W. Gilchrist.
Geneva	W. H. Cooksey.	Wayne	M. Dearborn.
Do	V. C. Shiekley.	West Point	R. F. Keoke.
Hartington	J. P. Jenal.	York	F. L. Whedon.
Holdrege	T. D. Trovis.		

* Reported present by another observer.

In NEVADA, in the autumn of 1886, the Sparrow was not known to be present at any point. It was reported not present at the following places:

Locality.	Observer.	Locality.	Observer.
Belmont	J. A. Ball.	Eureka	William J. Smith.
Carson City	G. C. White.	Genoa	W. L. Cox.
Cherry Creek	Daniel R. Collins.	Hawthorne	F. A. Angell.
Dayton	John Lothrop.	Paradise Valley	J. B. Case.
Elko	C. H. Sproule.	Pioche	John Shier.

In NEW HAMPSHIRE the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Franklin Falls	1879†	George Stolworthy.	Lisbon (1884)	1881†	Dr. C. H. Boynton.
Hanover		Arthur Fairbanks.	Milford	1876†	James P. Melzer.
Lancaster		I. W. Quimby.	Portsmouth ('84)	1877†	Sarah H. Foster.

† About.

In NEW JERSEY the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Blawenburgh	1883	David C. Voorhees.	Mount Holly		Henry I. Budd.
Bridgeton	1868	Charles E. Bellows.	New Providence	1866†	H. F. Barrell.
Caldwell	1870†	Marcus S. Crane.	Orange		Lloyd McK. Garrison
Chatham	1868†	George M. Swaim.	Do		Sereno E. Todd.
E. Orange (1884)	1877†	H. B. Bailey.	Passaic Bridge		F. M. Carryl.
Flemington		J. L. Connst.	Pennington	1881†	H. W. Westwood.
Freehold	1878	D. D. Denise.	Ridgewood	1872	Henry Hales.
Hackensack	1871	Weldon F. Fosdick.	Tuckerton	1873†	S. Jillson.
Do	1870†	Henry Stewart.	Trenton	1870†	Prof. A. C. Apgar.
Haddonfield	1870[?]	Samuel N. Rhoads.	Woodstown	1874	James D. Lausen.
Merchantville	1876†	Edward Burrough.			

† About.

In NEW MEXICO, in the autumn of 1886, the Sparrow was not known to be present at any point. It was reported not present at the following places:

Locality.	Observer.	Locality.	Observer.
Blossburgh	A. Cox.	Raton	R. K. Vandiver.
Chloride (1885)	G. Douglas Robertson.	Santa Fé	A. Seligman.
Elizabethtown	J. F. Carrington.	Silver City	O. L. Scott.
Fort Union	Ed. D. Woodbury.	Socorro	I. E. Leonard.
Fort Wingate	Dr. R. W. Shufeldt.	Springer	A. J. Howell.
Las Vegas	T. Labodie.		

In NEW YORK the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer,	Locality.	First appeared.	Observer.
Albion		L. H. Beach.	Lockport		Lewis H. Hill.
Alfred Centre		F. S. Place.	Lyons		J. S. Roys
Amityville		Andrew Chichester.	Mexico (1884)	1876†	George A. Davis.
Angelica	1883	E. D. Barnum.	New York (1884)	1864†	W. A. Conklin.
Atlanticville	1880	Eugene A. Jackson.	Do		James B. Williams.
Baldwinsville		Rev. W. M. Beauchamp.	Northport (1884)		William Crozier.
Bath	1871†	Reuben E. Robie.	Old Westbury		John D. Hicks.
Binghamton	1871†	H. J. Gaylord.	Oswego (1884)	1870†	D. D. Stone.
Boonville		A. M. Church.	Painted Post	1876†	A. H. Wood.
Do	1874†	Edward Snow.	Penn Yan		G. C. Snow.
Brooklyn		W. J. Kenyon.	Phœnix	1884	Benjamin F. Hess.
Do	1850	Hon. Nicolas Pike.	Pt. Washington		Henry M. Burtis.
Buffalo	1871†	Dr. W. H. Bergtold.	Do		Percy Hicks.
Cairo	1878†	O. T. Schermerhorn.	Po'keepsie (1884)	1864†	Dr. A. Hasbrouck.
Canaseraga		E. S. Gilbert.	Rochester (1884)	1869†	H. Roy Gilbert.
Charlton	1878†	F. D. Curtis.	Rochester	1872	Henry Harrison.
Clyde	1877	William McLachlan.	Rochester (suburbs).	1875†	H. M. Jennings.
Constableville		S. T. Miller.	Rochester	1865†	P. C. Reynolds.
Constantia	1881†	Wallace D. Rhines.	Schuyler's Lake	1880	Le G. Southworth.
Dobbs Ferry	1866†	Dr. C. B. McQuesten.	Shelter Island	1877†	W. W. Worthington.
Dunkirk		D. A. A. Nichols.	Sing Sing (1887)	1866†	Dr. George J. Fisher.
East Genoa (1884)	1875†	T. J. Henry.	Southampton	1875†	G. H. White.
Flushing (1884)	1874†	D. C. Beard.	Sparkill		J. G. Bell.
Fort Schuyler		Alexander Ferreira.	Staten Island		Thomas Munroe.
Fredonia	1870†	C. E. Bartram.	Syracuse	1863†	E. M. Hasbrouck.
Geneva		C. S. Plumb.	Tully	1878	J. A. Dakin.
Ghent	1878†	George T. Powell.	Utica	1861†	Thomas Birt.
Heath	1880†	Howard Burhans	Vernon Centre	1878	Graham Bronson.
Highland Falls (1884).	1871†	Dr. E. A. Mearns.	Warsaw	1877	James O. McClure.
Hinsdale	1882†	C. R. Bowen.	Watertown		Herbert M. Hill.
Hudson	1880†	Charles W. Snyder.	West Brighton		C. M. Raymond.
Ithaca		A. G. Genung.	West Farms	1864†	James Angus.
Do	1883	Prof. I. P. Roberts.	Westport	1876	George C. Osborne.
Le Roy		Prof. F. M. Comstock.	Winfield	1876†	O. P. Hitchings.
Little Valley		H. S. Huntley.	Yonkers (1884)		F. T. Holder.

† About.

It was reported not present at the following places in New York:

Locality.	Observer.	Locality.	Observer.
Centre Lisle	A. L. Reed.	Springwater	D. B. Waite.
Gilbertsville	J. C. Donaldson.		

In NORTH CAROLINA the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Albemarle	1883†	J. M. Bivins.	Milton	1877†	E. W. Faucette.
Asheville	1884	J. D. Cameron.	Mocksville	1881†	Jane E. Austin.
Brevard	1886	B. C. Lankford.	Morganton	1883†	J. A. Claywell.
Carthage	1883†	G. C. Graves.	Mount Airy	1880	B. Y. Graves.
Cashiers	....	E. J. Bennett.	Mount Gilead	1886	L. A. Christian.
Charleston	1886	D. K. Collins.	Murfreesboro	1877	W. B. Spencer.
Clayton	1884	W. J. Y. Thurston.	New Berne	1876†	M. Manly.
Clinton	1884†	C. P. Johnson.	Do	....	John D. Whitford.
Columbia	1883	C. E. Tatem.	New Market	1882	H. H. Beeson.
Company's Shops	1883	M. M. Shoffner.	Oxford	1884†	I. A. Taylor.
Concord	1879	Mary R. Dusenberg.	Pigeon (1887)	....	Dr. C. Hart Merriam.
Dallas	1883†	Mrs. S. A. Moore.	Pittsborough	1881†	E. T. Adney and Ivy Hill.
Danbury	1883†	N. A. Martin.	Pittsborough	1881†	Laura E. Horne.
Durham	1875†	J. H. Allen.	Plymouth	1885†	J. B. Hilton.
Edenton	1883†	L. L. Brinkley.	Polkton	1884	R. B. Gaddy.
Enfield	1884†	T. L. Whitaker.	Raleigh	1881†	S. A. Ashe.
Fayetteville	1883†	G. W. Lawrence.	Do	1880†	Clement S. Brimley.
Do	1884†	J. B. Smith.	Do	1881†	T. C. Williams.
Franklin	1885	John O. Harrison.	Rockingham	1883†	P. W. Stausill.
Franklinton	1880†	H. S. Furman.	Rocky Mount	....	S. L. Hart.
Gatesville	1884†	William T. Cross.	Rutherfordton	1885†	Albert L. Grayson.
Goldsborough	1879†	John H. Hill.	Salisbury	1883†	Postmaster.
Graham (1888)	....	Robert J. Thompson.	Snow Hill	1882†	James T. Sugg.
Henderson	1877	Postmaster.	Statesville	1881†	W. S. Lewis.
Hendersonville	1883†	J. L. Egerton.	Do	1880	Mont. Robbins.
Hickory	1883†	Postmaster.	Trenton	1885†	M. C. Giddens.
Jackson	1882	D. A. Jordan.	Washington	1883†	Maeon Bonner.
Jefferson	1885	J. D. Thomas.	Waynesville	1886	John M. Davis.
Kenansville	1880†	Mary A. Watson.	Wentworth	1881†	Numa F. Hancock.
Kernersville	1881†	J. H. Lindsay.	Wilkesborough	1881†	A. Rousseau.
King's Mountain	1884†	W. A. Mauney.	Williamston	1884†	John R. Lanier.
Kinston	1879†	W. J. Barrett.	Wilmington	1883	Norwood Giles.
Lenoir	1884	J. R. Widby.	Wilson	1876†	William M. Gay.
Lexington	1878	John C. Hunt.			

† About.

It was reported not present at the following places in North Carolina:

Locality.	Observer.	Locality.	Observer.
Aaron	C. C. Banner.	Mann's Harbor	Julia A. Mann.
Bayborough	W. H. Sawyer.	Marshall	F. C. Ebbs.
Beaufort	David Pierce.	Murphy	J. W. King.
Boone	D. B. Daugherty.	Nashville	William T. Griffin.
Burgaw	A. H. Paddison.	New Market	H. H. Beeson.
Burnsville	Jule A. Abernathy.	Smithville	W. R. Fergerson.
Chapel Hill	W. R. Mallett.	Vineyard	S. Otho Wilson.
Clarkton	A. K. Cromastic.	Welch	T. J. Welch.
Fairfield	R. L. Young.	Yadkinsville	N. E. Thomarron.
Laurel Hill	Jesse Hargrave.		

In OHIO the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.
Akron	1875	Prof. E. W. Claypole.
Do	1875	Ferdinand Schumacher.
Ashley	1880†	W. W. Stratton.
Augusta	1881†	A. McLean.
Avondale	....	Charles Dury.
Bainbridge	1874†	A. S. Jones.
Barry	1886	U. G. Gordon.
Batavia	1880	Stephen Cramer.
Bellaire	....	D. W. Cooper.
Do	....	W. K. Morrison.
Berea	1880†	Dan C. Stearns.
Bevis	1871†	George A. Wyckoff.
Brecksville	1878†	George W. Hollis.
Bridgeport	1881	John Cook.
Brookfield	1880†	J. D. Clark.
Bucyrus	1878	Shannon Clements.
Burton	1881†	P. W. Parmelee.
Caldwell	1881†	D. S. Spriggs.
Cambridge	1830	W. H. H. McIlyas.
Canal Dover	1881	S. M. McLean.
Canton	1883	J. F. Niesz.
Carthage	1875	C. S. Johnson.
Castalla	1878†	F. A. Deighan.
Chagrin Falls	1876	J. J. Stranahan.
Chester Hill	1883	Charles Archer.
Cheviot	1871†	Fannie Hagen.
Chillicothe	1871†	William E. Gilmore.
Cincinnati	....	Wm. Hubbell Fisher.
Cincinnati (1888)	1869	Dr. F. W. Langdon.
Cincinnati	....	Adolph Leue.
Hamilton County	....	F. G. Skinner.
Circleville	1878	Dr. Howard Jones.
Clarington	1878†	B. H. Mallory.
Cleveland	1877	L. M. Davies.
Do	1873†	W. F. Doertenbach.
Do	1872†	S. R. Ingersoll.
Do	1869	Dr. E. Sterling.
Do	1871†	T. P. Spencer.
Cleves	1876†	James Carlin.
Coalton	1883†	John Brady.
Coe Ridge	1879†	H. O. Carpenter.
Collamer	1876†	L. A. Steele.
College Hill	....	H. A. Koch.
Do	....	W. T. Southgate.
Collinwood	1881†	Chas. L. Gilbreath.
Columbus (1884)	1872†	Dr. J. M. Wheaton.
Coshocton	1874	H. D. Beach.
Dayton (1884)	1867†	John L. H. Frank.
Delaware	1876†	Geo. W. Campbell.
Dent	1874†	William Oettinger.
Dover	1871†	N. B. Hurst.
Dunkirk	1881†	Charles Mahon.
East Liverpool	1878†	Harry H. Suils.
East Rockport (1884).	....	Henry W. Elliott.
East Rockport	....	A. Hall.
Elida	1876	S. D. Crites.
Euclid	....	Edward D. Pelton.
Fayette	1880†	Samuel Binns.
Gallipolis	1872†	S. F. Neal.
Garrettsville	1881	A. J. Smith.
Georgetown	1881†	Elizabeth Roth.
Glendale	1879†	Mrs. M. Devanney.
Glenville	....	M. W. Miles.
Greenville	1884	J. N. Lowry.
Hamilton	1868†	George Harbron.
Harrison	1874†	D. C. Jones.
Hillsborough	1883†	Edward L. Warson.
Ironton	1877†	B. F. Ellsberry.
Jefferson	1879†	A. C. White.
Kempton	1885	S. W. Kemp.
Kenton	1885	N. R. Piper.
Kingston	1878†	Benj. P. Asbury.
Lebanon	1884†	Martin A. Jameson.
Lee	1884	Henry Fisher.
Leetonia	1879†	C. N. Schmick.
Lima	1881	R. W. Meily.
Logan	1881†	A. H. Wilson.
London	1886	T. W. Blackiston.
McArthur	1878†	George Lantz.
McConnelsville	1883	C. H. Morris.
Macksburgh	1883†	O. S. Gilchriest.
Madeira	1882†	Jos. A. Muchmore.
Malta	1884†	George H. Street.
Marietta	1870†	Dudley S. Nye.
Martin's Ferry	1882†	James Y. Patterson.
Martinsville	1882†	Thomas B. Gaddis.
Marysville	1880	E. W. Porter.
Mechanicstown	1881†	E. S. Martin.
Mentor	1881†	J. M. Keck.
Middletown	1874†	Lewis Lambright.
Milnersville	1882†	J. T. Johnson.
Morristown	....	John H. Carey.
Do	1882†	W. A. Fenton.
Mount Airy	1884	Henry Telgheder.
Mount Healthy	....	Empson Reeves.
Mount Vernon	1876†	B. L. Swetland.
Napoleon	1876†	J. L. Haltes.
New Athens	1882	T. M. Sewell.
New Lisbon	1880	J. F. Benner.
New Philadelphia.	1884†	E. Fribley.
Newton Falls	1881	E. W. Turner.
New Winchester.	1882†	Josiah Keiter.
Niles	1878†	H. H. Mason.
Noble	1884	A. D. Lowden.
North Bend	1875	R. H. Warder and James B. Matson.
North Linndale	1878†	Robert Linn.
North Royalton	1879†	Thomas C. Coatz.
Norwalk	1879†	S. Gray.
Do	1880†	George Lamkin.
Nottingham	1880†	J. J. Luikart.
Oak Hill	1882†	J. C. Alexander.
Olmsted	1877†	A. Osborn.
Oxford	1878†	L. N. Bonham.
Parma	1884	Oliver Emerson.
Petersburgh	1876†	J. L. Ernst.
Plainville	1876†	A. L. Bodine.
Pomeroy	1880†	C. Ihle.
Portsmouth	1874†	S. R. Ross.
Preston	1875	Thomas Shroyer.
Prout	1877†	S. C. Prout.
Reading	1874†	H. H. Varjohar.
Ridgeway	1874†	John Davis.
Ripley	1876†	M. M. Murphy.
Saint Clairsville	....	T. W. Emerson.
Salem	....	Mrs. L. S. Solberg.
Do	1878†	James W. Suliot.
Sandusky	....	John T. Mack.
Sciotoville	1881†	J. H. Holman.
Sharon Centre	1884	F. G. Cottingham.
Sidney (1887)	1883	Edward Russell.
Solon	....	W. W. Richards.
Sparta	1883	J. C. Swetland.
Springfield	1882†	James Johnson.
Steubenville	1880†	George Moore.
Strongsville	1875†	J. Gallup.
Sugar Grove	1881†	Dr. S. Renshaw.
Urbana	1880†	S. L. P. Stone.
Wadsworth (1887)	1874†	Dr. J. F. Detweiler.
Wakeman	1881†	W. B. Hall.
Wapakoneta	1882†	D. J. Davis.
Warren	1869	William Hapgood.
Warsaw	1880†	Levi Gamble.
Wauseon	1884	Thomas Mikesell.
Waverly	....	H. H. Overman.
Wellston	1882†	Minor R. Potter.
West Berlin	1883	Charles H. Shaw and J. P. Roloson.
Weston	1884	J. O. Avery.
West Union	1883†	T. W. Ellison.

†About.

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Weymouth	1880†	Dr. Frank Young.	Wintersville	1879	Rev. F. I. Swaney.
Willow	1881	Ethie C. Kingsbury.	Winton Place		H. R. Crowl.
Wilmington	1876	William Clevenger.	Woodsfield	1878†	George P. Dorr.
Do		J. M. Haynes.	Do	1879†	Jas. R. Morris.
Do		Nathan M. Linton.	Wyoming	1874†	C. V. Stephenson.
Wilson's Mills	1883	D. S. Gilmore.	Young Hickory.	1884	Jas. M. Hutcheson.
Winchester	1880	J. Osburn.	Youngsville	1884†	U. A. Silcott.

† About.

It was reported not present at the following places in Ohio:

Locality.	Observer.	Locality.	Observer.
Ashtabula	Dan. J. Sherman.	Windsor Mills	Postmaster.

In OREGON, in the autumn of 1886, the Sparrow was not known to be present at any point. It was reported not present at the following places:

Locality.	Observer.	Locality.	Observer.
Amity	Thomas J. Jellison.	Jacksonville	Max Müller.
Arlington	F. T. Hurlburt.	La Grande	J. H. Shambaugh.
Astoria	John C. Bell.	Lake View	T. W. Calvin.
Aumsville	F. S. Matteson.	Linkville	William A. Wright.
Baker City	C. L. Palmer.	McMinnville	J. F. Wisecarver.
Beaverton (1885)	A. W. Anthony.	Oregon City	J. M. Bacon.
Canyon City	E. Hall.	Pendleton	Frank B. Clopton.
Cedar Mill	William B. Malleis.	Portland	C. W. Roby.
Corvallis	N. R. Barber.	Prineville	Jas. F. Moore.
Dallas	James D. Smith.	Roseburgh	B. Douden.
Empire City	J. B Gilbert.	Salem	W. H. Odell.
Eugene City	F. W. Osburn.	Saint Helen	F. A. Moore.
Heppner	C. G. Sloan.	Tillamook	M. B. Feamside.
Hillsboro	Mary A. Brown.		

In PENNSYLVANIA the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Albion	1880†	J. A. Robison.	Clarion	1877†	Miller Beatty.
Allegheny	1877	John Swan.	Clearfield	1876†	A. B. Weaver.
Altoona	1878†	T. B. Patton.	Collegeville		C. Augustus Rittenhouse.
Apollo	1876†	Labanah Townsen.	Columbia	1874†	C. F. Young.
Atglen	1876	William D. Doan.	Conneautville	1879†	William A. Hammon.
Barnhart's Mills	1879†	P. A. Rattigan.	Coudersport	1880†	M. S. Thompson.
Beatty	1881†	Sarah A. and George H. Adams.	Danville	1880†	Thomas Chalfant.
Beaver Falls	1871†	S. S. McFerran.	Delmont	1884	J. D. Paily.
Belle Vernon		James Hagerty.	Du Bois	1878†	J. P. Taylor.
Blairsville	1877†	Isabella Campbell.	Duncannon		Jos. M. Shatto.
Bloomsburgh	1877	George A. Clark.	East Bethlehem	1880	Emma C. Adams.
Bradford		Jas. A. Teulon.	Ebensburgh	1871†	Jas. G. Hasson.
Do	1880†	C. B. Whitehead.	Elk Lick	1882†	Silas A. Wagner.
Bristol	1884†	Dr. J. De Benneville Abbott.	Emlentown	1880†	H. A. Hamilton.
Brockwayville	1882†	B. T. Chapin.	Emporium	1874	J. M. Judd.
Brookville	1878†	Laselle R. Erdice.	Enon Valley	1875†	John O. Caskey.
Brownsville	1877†	J. Holmes Patton.	Erie	1871†	T. Dwight Ingersoll.
Bryn Maur	1878†	A. R. Montgomery.	Do	1874†	H. C. Shannon.
Butler		W. P. Roessing.	Fayette City	1880†	J. M. Barker.
Carmichael's	1878†	Charles W. Barkman.	Foxburgh	1882	John G. Hager.
Do	1880	G. W. Daugherty.	Franklin		D. D. Grant.
Chambersburgh	1872†	Davison Greenawalt.	Gap		John C. Linville.
			Germantown		Thomas Meehan,

† About.

Locality.	First appeared.	Observer.
Germantown	1873†	Witmer Stone.
Do		Wm. Rotch Wister.
Gettysburgh		H. L. Benner.
Glen Rock	1880†	L. W. Shafer.
Greencastle	1873†	H. P. Prather.
Greensborough	1881†	A. V. Boughner.
Greensburgh	1874†	W. C. Loor.
Hanover	1872†	William Heltzel.
Hare's Valley	1884†	Samuel B. Greene.
Hollidaysburgh	1876†	James M. Lingafelt.
Do	1881†	M. A. Young.
Huntingdon	1878†	Margaret A. Tyburst.
Irwin	1872†	S. D. Lauffer.
Jamestown	1878†	M. E. Gardner.
Johnstown	1878†	Herman Baumed.
Kittaning	1876†	E. A. Brodhead.
Lancaster	1870†	Dr. S. S. Rathvon.
La Porte	1882†	Walter Spencer.
Latrobe	1880	John A. Showalter.
Lewisburgh	1876	Dr. George G. Groff.
Lewistown		R. W. Palton.
Ligonier	1876†	C. F. Marker.
Lock Haven		William W. Rankin.
McConnellsburgh	1876†	J. S. Shade.
McDonald	1880	P. Hoey.
McKeesport		J. B. Shale.
Mansfield	1879†	N. A. Elliot.
Mansfield Valley	1882†	Dr. R. L. Walker.
Marysville	1874†	W. S. Gault.
Meadville		E. W. McArthur.
Meyersdale	1874†	M. A. Rutter.
Middleburgh	1868†	I. G. Barber.
Middletown	1876†	Eva Ross Wiestling.
Mifflintown	1878†	Charles B. Crawford.
Milford	1874†	C. W. Dimmick.
Monongahela C'y	1880†	James H. Moore.
Mount Pleasant	1879†	John D. McCaleb.
Muncy	1874†	J. H. Fulmer.
New Bedford	1881†	Martin Jackson.
New Bethlehem	1877†	James E. Williams.
New Brighton	1880†	W. G. Braden.
New Castle	1881	William T. Butz.
Do	1873	William Gordon.
New Lexington	1875†	Dr. H. D. Moore.
Newport (1884)	1872†	E. L. Knight.
Newville	1874†	John M. Woodburn.
New Wilmington	1882	Hugh Wilson.
North East	1880†	Isaac Hortan.
Do	1878†	Harry E. McNichol.
Northumberland	1872†	J. C. Forsyth.
Osceola Mills	1877†	Jacob Ritzman.
Parker's Landing	1875†	P. Bracken.
Philadelphia		J. Percy Moore.
Do		F. R. Welsh.
Phillipsburgh	1881†	John Gowland.
Pittsburgh	1871†	J. B. Larkin.
Pleasantville	1881	Geo. L. Haworth.
Pottstown	1870†	John H. Steele.
Punxsutawney	1880†	H. C. Bair.
Radnor	1878†	W. W. Montgomery.
Renfrew	1883†	F. H. Brown.
Reynoldsville	1884	W. C. Schultze.
Ridgway	1881†	J. H. Hagerty.
Rockwood	1883	Harrison Snyder.
Rouseville	1876†	George A. Lyford.
Saegerstown	1878	C. E. Hunter.
Saltsburgh	1878†	Francis Laird.
Scottdale	1880	J. P. Owens.
Selin's Grove	1876†	George R. Hendricks.
Sharon		C. W. Ray.
Shippensburgh	1868†	J. A. C. McCune.
Smethport	1881	M. A. Sprague.
Somerset	1879	J. K. Coffroth.
Do	1876	J. H. Fritz.
South Bethlehem		Robert W. Barrell.
Steelton		W. H. H. Sieg.
Stroudsburgh	1876†	Darius Dreker.
Taylorstown	1882†	John Knox.
Tidioute	1883	William R. Dawson.
Tionesta	1880†	Samuel H. Haslet.
Titusville	1871†	M. N. Allen.
Towanda	1876†	E. A. Parsons.
Troy	1875†	A. K. Linderman.
Tyrone	1873†	P. A. Reed.
Uniontown		M. D. Baker.
Ursina	1881†	L. J. Benford.
Wampum	1882†	Charles C. Cox.
Warren	1876†	Postmaster.
Washington	1874	Jas. Brady.
Waynesborough	1878†	E. B. Engle.
Waynesburgh	1871†	Jas. S. Jennings.
West Chester		Dr. B. H. Warren.
West Newton	1884†	A. M. Dick.
Williamsport	1876†	W. F. Logan.
Willow Street		Dr. I. H. Mayer.
Wrightsville	1867†	Jacob H. Freet.
York		James Kell and H. L. Fisher.

† About.

It was reported not present at the following places in Pennsylvania:

Locality.	Observer.
Dushore	E. A. Strong.
Milledgeville	I. Wilson Shaw.
Thorndale	John H. Steele.

In RHODE ISLAND the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Central Falls		William H. Lewis.	Peace Dale	1858	R. G. Hazard, 2d.
Hill's Grove		Fred. T. Jencks.	Providence	1866†	Fred. T. Jencks.
Newport	1875†	Chas. H. Lawton and John J. Peckham.	Do		W. V. Osterhout.
Do	1881	John M. Swan, jr.	Westerly	1874	B. F. Maxson.
Pawtucket		William H. Lewis.	Do		Byron J. Peckham.
Peace Dale	[1858]	Eli Whitney Blake, 3d.	West Kingston	1882†	John G. Clarke.

† About.

In SOUTH CAROLINA the Sparrow was reported present in the autumn of 1886 at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Aiken	1880	James E. Crosland.	Greenville County	1884	Dr. M. A. Hunter.
Anderson C. H	1881†	Charles W. Webb.	James Island	1882	W. I. Hinson.
Bamberg		D. F. Hooton.	Jonesville	1884	R. A. Whitlock.
Bennettsville	1886†	T. L. Crosland.	Lancaster C. H	1884†	Howell J. Gregory.
Camden	1883	D. C. Kirkley.	Laurens C. H	1883†	H. W. Anderson.
Charleston (1884)		Dr. G. E. Manigault.	Meriwether	1881†	J. W. Johnson.
Cheraw	1884†	M. W. Duvall.	Mount Pleasant	1885	J. R. Thomlinson.
Chester, C. H	1872	J. K. Henry.	Newberry C. H.	1876†	D. O. Herbert.
Do	1873	J. N. Youngblood.	Rock Hill	1883†	Buena V. Wood.
Columbia	1869†	W. H. Gibbes.	Seneca	1883†	Clara K. Livingston.
Darlington C. H.	1883†	B. C. Law.	Sumter C. H.		D. J. Auld.
Edgefield C. H.	1881†	W. H. Brunson.	Winnsborough	1881†	D. Egleston.
Gaffney	1881†	N. C. Snead.			
Greenville	1876†	S. S. Crittenden.			
Greenville County	1886	Joseph Cooper.			

† About.

It was reported not present at the following places in South Carolina:

Locality.	Observer.	Locality.	Observer.
Aiken*	S. C. Satterthwait.	Manning	S. J. Bowman.
Conway	James H. Porter.	Marion C. H	M. Gue Dubois.
Frogmore	Walter Hoxie.	Port Royal	R. E. Jenkins.
Georgetown	S. M. Ward.	Walterborough	Edward M. Jones.
Hampton	John B. Binnicker.	Waverley Mills	W. St. I. Mazyck.
Kingstree	John A. Whittemore.		

* Reported present by another observer.

In TENNESSEE the Sparrow was reported present, in the autumn of 1886, at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Alamo	1884†	R. G. Harris.	Livingston	1883†	John Hart, jr.
Andersonville	1883†	J. K. P. Wallace.	Loudon	1880†	J. T. Simpson.
Ashland City	1886	W. W. Sanders.	Lynchburgh	1884	J. N. Taylor.
Athens	1878†	John Q. Strange.	McMinnville	1883†	R. Kennedy.
Brownsville	1879†	John Clinton.	Madison (1887)	....	Dr. C. Hart Merriam.
Camden	1884	W. A. Steele, jr.	Madisonville	1882†	E. W. Cozatt.
Carthage	1881	Callie Merony.	Manchester	1885	S. N. Burger.
Celina	1885†	D. W. Cullom.	Maynardville	1881	A. L. Leinart.
Centreville	1885	J. H. Russell.	Memphis	1871	J. M. Fowlkes.
Chattanooga	1879†	George W. Martin.	Morristown	1877	S. W. Shields.
Clarksville	1881	M. B. Johnson.	Mountain City	1883	S. D. Jackson.
Cleveland	1881	Postmaster.	Murfreesboro	1882†	Frank White.
Clifton	1885	W. Y. Montague.	Nashville	1878	Mrs. Anna B. Cheatham.
Clinton	1876	R. S. Kincaid.	Do	1878†	Judge John C. Ferriss.
Cookville	1884	Jas. M. Hinds.	Do	1878†	A. J. McWhirter.
Covington	1882	Jas. Byars.	Do	1877	A. H. Sharp.
Do	1882†	W. M. Hall.	Newport	1886	George P. Mines.
Dandridge	1881†	H. C. Routh.	Ooltewah	1882†	Z. S. Watkins.
Dayton	1882†	W. T. Broyles.	Paris	1883†	Dr. John T. Irion.
Decatur	1883†	I. C. Arrants.	Pikeville	1882†	Will A. Brown.
Decaturville	1886†	J. H. Stout.	Pulaski	1882†	H. Clay McLaurine.
Dickson	1884†	Eugene Kelsey.	Do	1883	J. B. Stacy.
Dover	1882	W. P. Bruton.	Purdy	1884	W. H. Braden.
Ducktown	....	I. J. Stamper.	Rhea Springs	1885	J. A. Abernathy.
Dyersburgh	1885	M. V. Borum.	Ripley	1885	H. T. Hanks.
Elizabethtown	1882†	W. M. Shell, jr.	Rogersville	1882†	Samuel P. Powel.
Erin	1883†	N. O. Thomas.	Savannah	1886	D. T. Street.
Fayetteville	1881†	Wm. B. Douthat.	Sevierville	1881†	Pleasant Stafford.
Franklin	1883†	Thomas E. Haynes.	Shelbyville	1884†	Eugene Blakemore.
Gallatin	1882	A. A. Lewis.	Sneedville	1884†	G. W. Margraves.
Greeneville	1884†	T. J. Lane.	Somerville	1876†	C. L. Dickinson.
Hartsville	1882†	John D. Stalker.	South Pittsburgh	1885†	Jennie R. Livingston.
Humboldt	....	J. H. Koffman.	Sparta	1885	W. L. Dibrell.
Huntingdon	1880	H. C. Brewer.	Tate Springs	1885†	Thomas Tomlinson.
Jacksborough	1883	J. Henderson Reid.	Taylorsville (1887).	....	Dr. C. Hart Merriam.
Jackson	1883	R. R. Dashiell.	Tazewell	1883†	R. F. Carr.
Do	....	Prof. E. H. Randle.	Do	1879	Thomas P. Graham.
Jamestown	....	S. V. Bowden.	Tiptonville	1881	John D. Arnett.
Jonesborough	1881†	F. W. Earnest.	Tree Hill (1885)	....	E. T. Wine.
Kingston	1881	W. H. McNutt.	Trenton	1881†	Everett Bell.
Knoxville	1874†	J. M. King.	Do	....	H. C. Pearce.
La Fayette	1883†	E. G. Cartwright.	Union City	1883	W. R. Andrews.
Lawrenceburgh	1885	W. T. Nixon.	Do	1884	W. C. McCampbell.
Do	1885†	W. A. Stewart.	Waverly	1883†	R. J. McAdoo.
Lebanon	1884†	J. B. Tolliver.	Woodbury	1883†	R. H. Preston.
Lewisburgh	1884†	R. A. Fergus.			
Lexington	1884†	W. F. Jones.			
Linden	1886†	J. H. Houssels.			

† About.

It was reported not present at the following places in Tennessee:

Locality.	Observer.	Locality.	Observer.
Alexandria	Irenus Beckwith.	Newburgh	Nancy Grinder.
Dunlap	Mrs. Lella Howard.	Rugby	Arthur Churchill.
Erwin	W. T. Davis.	Spencer	A. M. Clark.
Glenmary	A. McDonald.	Winchester	George D. Brambleet.
Henderson	J. M. Cunningham.		

In TEXAS the Sparrow was reported present, in the autumn of 1886 and spring of 1887, at the following places:

Locality.	First appeared.	Observer.
Galveston	1867	J. M. Brown.
Do	1877	Oswald Schindler.
Do	1872†	Arthur Walker.
Houston	1884†	Robert Burns.
Jefferson	1882†	E. Sterm.
San Saba	1886	A. B. Hayworth.

† About.

It was reported not present at the following places in Texas:

Locality.	Observer.
Abilene	H. H. Harden.
Athens	Thomas M. Matthews.
Austin	A. V. Lane.
Do	Dr. Q. C. Smith.
Do	Dr. E. P. Stiles.
Baird	J. F. Rettig.
Bastrop	C. R. Haynie.
Beaumont	A. J. Ward.
Belle Plain	Lucas W. Bellamy.
Big Spring	John Snoddy,
Bobbin	J. M. Stinson.
Bonham	John W. Duncan.
Bowie	Barbara E. Cook.
Brackettville	C. A. Gilclea.
Brazoria	Mrs. Maria S. Cochran.
Brenham	J. M. Byrnes.
Brownsville	Benjamin Kinalski.
Bryan	John Q. Tabor.
Burnet	M. E. Coffee.
Caldwell	James J. McMillan.
Calvert	T. J. McHugh.
Cameron	J. M. Barton.
Canton	J. B. Hanes.
Carthage	H. M. Knight.
Castroville	Samuel Lytle.
Cat Spring	August Kinkler.
Centreville	Jerry McDaniel.
Clarkesville	E. P. Rutherford.
Clear Creek	T. Cooke.
Cleburne	S. N. Clark.
College Station	George W. Curtis.
Collins	Frederick B. Nayer.
Do	George Hobbs.
Colorado	P. A. Hazzard.
Comanche	R. M. Garner.
Cooper	J. N. Boyd.
Corpus Christi	J. H. C. White.
Cotulla	H. A. Keck.
Daingerfield	L. M. Allen.
Dallas	John H. Cochran.
Do	Julien Reverchon.
Decatur	A. H. Shoemaker.
Denison	L. L. Maughs.
Do	James Nimon.
Denton	J. D. Bates.
Dublin	H. E. Brown.
Elmo	W. M. Lindsey.
Emory	M. S. Pierson.
Encinal	M. J. Ellis.
Fairfield	L. G. Sandifed.
Farrsville	A. J. Johnson.
Fort Stockton	F. W. Young.
Fort Worth	Julian Feild.
Franklin	E. Reynolds.
Gabion	E. A. Wilson.
Gainesville	T. J. Parrish.
Do	George H. Ragsdale.
Georgetown	D. T. Chessher.
Giddings	M. A. Clark.
Gilmer	W. F. Shrum.
Gonzales	W. V. Collins.
Groesbeck	Drew D. Pender.
Hamilton	A. E. Steeir.
Harwood	M. C. Doyal.
Hemphill	L. C. Whittlesey.
Hempstead	John R. Young.
Henderson	C. G. Barnett.
Henrietta	Henry Eddy.
Hitchcock	Arthur Walker.
Hockley	James Norman.
Huntsville	W. H. Woodall.
Jacksonville	J. B. Brittain.
Kaufman	J. A. Marshall.
Kildare	C. C. Gallaway.
La Grange	Arthur Meirscheidt.
Laredo	H. A. Burbank.
Liberty	O. P. Baillio.
Livingston	Walter D. Willis.
Longview	Fidelia Kilgore.
Manor	John E. Hill.
Marienfeld	John A. Konz.
Marlin	T. C. Oltorf.
Marshall	J. H. Riggs.
Mason	Ira B. Henry.
Matagorda	A. A. Duffy.
Meridian	J. H. Johnson.
Mineola	John W. Cage.
Montague	A. H. Palmer.
Mount Pleasant	B. F. Johnson.
Mount Vernon	C. G. Parker.
Navasota	P. A. Smith.
Newton	L. B. Clark.
Orange	H. T. Davis.
Paint Rock	William Lloyd.
Palo Pinto	W. S. Conatser.
Paris	James T. Craiyo.
Pena Station	C. E. Bowers.
Pittsburgh	J. A. Derrick.
Plano	John P. Alexander.
Ranger	J. M. Davis.
Refugio	L. M. Rogers.
Richmond	D. A. Ferguson.
Rio Grande City	Luciana G. Davis.
Roma	Fred H. Hastings.
Rusk	N. C. Trimble.
San Antonio	Gustav Jermy.
Do	H. P. Howard.
San Augustine	B. D. Crocket.
San Diego	George Bodet.
Schulenburgh	Charles A. Kessler.
Seguin	J. Zorn, jr.
Sherman	L. S. McPherson.
Smith's Point	Charles N. Eley.
Spring	C. Bender, jr.
Stephenville	E. B. Jones.
Strawn	T. A. Guthrie.
Sweet Water	A. F. Decker.
Taylor	J. O. Frink.
Terrell	B. S. Martin.
Trinity	R. T. Walker, jr.
Troup	R. H. Powell.
Tyler	R. B. Long and F. L. Yoakum.
Uvalde	N. L. Stratton.
Victoria	Thomas R. Cocke.
Waco	G. B. Gerald.
Wallisville	F. H. Holmes.
Waxahachie	Edwin B. Clark.
Do	Dr. Thomas W. Florer.
Weimar	F. A. Hill.
Wharton	Postmaster.
Wichita Falls	George A. Giddings.
Willis	Lucy M. Bell.
Will's Point	W. F. Weaver.
Winnsborough	A. McBride.
Woodville	W. H. Stewart.

In UTAH the Sparrow was reported present, in the autumn of 1886, at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Alpine City	1884	T. J. McCollough.	Morgan	1885	J. Williams.
Call's Fort	1886	Elmer Loveland.	North Ogden	1882†	Sidney Stevens.
Cedar Valley	1881†	L. B. Rodeback.	Ogden	....	J. G. Scott.
Chester	....	A. W. Candland.	Plain City	1883†	Charles Neal.
Coalville	1873†	Mary E. Rhodes.	Pleasant Grove	1873†	Mrs. P. Sterrett.
Corinne	1883	Edward R. Chase.	Provo City	1883†	Daniel Graves.
Draper	1883†	James Jenson.	Do	1880	James G. Kenney.
Echo City	1883†	F. Hirst.	Richmond	1885†	Cornelius Traveller.
Fairfield	1882	H. Snyder.	Salt Lake City	1876†	W. C. Brown.
Granite City	1884†	Wm. Thompson, jr.	Sandy	1883†	George Marriott.
Hyde Park	1882†	E. A. Daine.	Santaquin	1884	T. J. Kirkman.
Juab	1884†	Orrawell Williams.	Smithfield	1885†	James S. Cantwell.
Logan	1885	M. A. Shirley.	South Jordan	1876†	John Holt.
Mendon	1884†	Fred Larsen.	Springville	1884	H. M. Dougall.
Mill Creek	1874†	John Morgan.	West Jordan	1884†	B. L. Cutler.
Mona	1881†	W. A. Newton.	Willard	1881†	Thos. W. Brewerton.

† About.

It was reported not present at the following places in Utah:

Locality.	Observer.	Locality.	Observer.
Alta	Henry C. Wallace.	Fountain Green	Rees R. Lewellyn.
Beaver	Willson G. Nowers.	Nephi	James Larsen.
Bingham Canyon	Bernard Quinn.	Peterson	Edwin Willams.
Blue	C. M. Clay.	Salem	J. J. Davis.
Centerville	T. J. Brandon.	Stockton	Alma N. Yaunly.
Croydon	Thomas W. Walker.	Terrace	S. H. Cave.
Cub Hill	Samuel J. Allen.	Wales	Jonathan Midgley.

In VERMONT the Sparrow was reported present, in the autumn of 1886, at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Burlington (1884)	1876†	George H. Perkins.	Lyndonville	1884†	I. W. Sanborn.
Charlotte (1884)	....	F. H. Horsford.	Montpelier	1874†	Caleb C. Eaton.
Charlotte	....	Minerva E. Wing.	Rutland (1884)	1874†	Jenness Richardson.
East Bethel	1880†	C. S. Paine.	Saint Johnsbury (1884).	1874†	Rev. Henry Fairbanks.
Glover	1881†	C. P. Owen.	Taftsville (1884).	....	C. O. Tracy.
Hartford	....	Allen Hazen.	West Pawlet	1874†	Dr. Frank H. Braymer.
Hydeville	1883	A. I. Johnson.			
Keeler's Bay	1881	Stephen P. Gordon.			
Lunenburgh	1884	W. E. Balch.	West Pawlet (1884).	....	Albert H. Phelps.
Do	1880	Dr. Hiram A. Cutting.	Woodstock.	....	Norman Paul.

† About.

In VIRGINIA the Sparrow was reported present, in the autumn of 1886, at the following places:

Locality.	First appeared.	Observer.
Abingdon	1875†	J. M. Rose.
Accòmac C. H	1881†	William P. Bell.
Accotink	1874†	E. E. Mason.
Amelia C. H	1884†	G. H. Southall.
Amherst C. H	1880†	W. H. Wills.
Appomattox C. H.	1881†	N. H. Ragland.
Ashland		A. C. Mayo.
Barboursville	1884	G. S. Parker.
Berryville	1876	J. N. Shepherd.
Blacksburgh	1881†	A. T. Keister.
Bland C. H	1883†	R. C. Green.
Bowling Green	1878†	L. J. Baker.
Bridgewater	1879†	M. Strickler.
Broadway	1878†	Mary E. Pugh.
Buckingham C. H.	1876	Alex. T. Moseley.
Burkeville	1879†	H. H. W. Crittenden.
Charlottesville	1881†	M. H. L. Long.
Chase City	1881	I. C. Bacon.
Chatham	1879†	William B. Hurt.
Christiansburgh	1876†	R. M. Gardner.
Clifton Forge		S. M. Butler.
Clover Depot	1886	Postmaster.
Covington	1881†	John B. Pitzer.
Cuckoo	1883	W. P. Thornton.
Culpeper	1873†	Jas. T. Robertson.
Cumberland C. H	1883†	John S. Taylor.
Danville	1874†	T. R. McDearman.
Dayton	1881†	H. K. Devier.
Dublin	1878†	W. F. Peters.
Eastville	1885†	Leonard J. Nottingham.
Edenburgh	1882†	Mary M. Calohan.
Emory	1886†	C. B. Akers.
Estillville	1882	W. F. Edmonds.
Fairfax C. H	1880	Jos. W. Whitehead.
Farmwell	1880	C. A. Arundell.
Fincastle	1881†	C. B. Camper.
Floyd C. H	1876	William Pendleton.
Fortress Monroe, (1884)		Lieut. A. W. Vogdes.
Franklin	1875†	A. M. Brownley.
Fredericksburgh.	1878†	Frank T. Forbes.
Front Royal	1880†	W. C. Weaver.
Glen Allen	1883†	J. Hopkins.
Gloucester C. H	1881†	A. P. Davies.
Goochland C. H.	1880†	C. H. Powell.
Halifax C. H.	1882†	R. H. Edmondson.
Hampton	1881†	Mattie K Chisman.
Harrisonburgh	1871†	Wm. H. Ritenour.
Hicksford	1877†	P. R. Farley.
Hillsville	1876†	H. H. Farmer.
Independence	1883†	J. W. Boyer.
Jonesville	1881	John M. Couk.
Keswick Depot	1882†	H. E. Magruder.
Do	1880†	E. C. Mead.
King George C. H.	1882†	H. H. Hunter.
King and Queen C. H.	1886†	W. B. Bird.
Lawrenceville	1876	W. T. Sledge.
Lebanon	1881†	J. F. Amburgey.
Lexington	1876	John A. R. Varner.
Lick Run	1880	J. T. Paxton.
Lovingston	1883	William Stephenson.
Lynchburgh	1876†	Chas. W. Button.
Madison C. H.	1878†	Brittell Krider.
Manassas	1876†	Robert C. Weir.
Manchester	1874	H. A. Jordan.
Marion	1877†	R. J. Haller.
Martinsville	1880†	C. L. Putzel.
Montrose	1884†	John Goodridge.
New Castle	1880†	John C. Carper.
New Kent C. H	1885†	J. R. Taylor.
New Market	1874†	George M. Neese.
Newport News	1883	W. D. Crowell.
Norfolk	1871†	M. Glennan.
Onancock	1880†	Stephen Hopkins.
Orange C. H	1884†	R. C. Macon.
Petersburgh	1874†	I. R. Patterson.
Pocahontas		J. L. Deaton.
Portsmouth		A. H. Lindsay.
Powhatan C. H	1884†	A. M. Howard.
Pulaski Station	1883	R. S. Dudley.
Pungoteague		W. T. Mason.
Richmond	1872	Wm. H. Cullingworth
Do	1882	Hugh L. Davis.
Do		Col. Randolph Harrison.
Salem	1870†	W. S. Oakey.
Saluda	1883†	Herbert L. Smither.
Scottsville	1878†	H. G. Harris.
Smithfield	1881†	E. A. Morrison.
Smithville	1881	B. P. Eggleston.
Spottsylvania C. H.	1876†	C. M. Ashby.
Stafford C. H.	1882†	M. W. Baines.
Stanardsville	1881†	J. G. Stephens.
Staunton	1870†	W. A. Burke.
Stuart	1884	C. R. Martin.
Suffolk	1874	Florine A. Hines.
Surry	1878†	Peyton A. Cocke.
Sussex C. H.	1882	John S. Bobbitt.
Tappahannock	1880	J. L. Henley.
Tazewell C. H	1882	Jas. C. Spotts.
Town House	1882†	Dr. John S. Apperson.
Upperville	1875†	Jas. M. Kinchelve.
Variety Mills	1881	H. Martyn Micklem.
Warm Springs	1884†	Robert T. Payne.
Warrenton	1876†	L. W. Caldwell.
Waterford	1870†	William T. Bennett.
Waynesborough.		R. G. Wright.
West Point	1879†	L. S. Garrett.
Williamsburgh	1880†	H. D. Cole.
Winchester	1870†	William S. White.
Wytheville	1875†	Alex. S. Haller.
Yorktown	1878†	F. M. Sheild.

† About.

The Sparrow was reported not present at the following places in Virginia:

Locality.	Observer.
Birdsnest	C. R. Moore.
Grundy	R. C. Beavers.
Mathews	L. M. Garnett.
Princess Anne C. H	James H. Bonney.
Warsaw	F. A. Shackleford.

In WASHINGTON TERRITORY, in the autumn of 1886, the Sparrow was not known to be present at any point. It was reported not present at the following places:

Locality.	Observer.	Locality.	Observer.
Asotin	Jennie L. Case.	Port Townsend	George G. McNamara.
Chehalis	William West.	Prescott	Jas. S. Haviland.
Dayton	J. T. Burns.	Puyallup	C. C. Field.
Ellensburgh	Jacob J. Mueller.	Seattle	Prof. O. B. Johnson.
La Conner	J. F. Dweliey.	Sprague	John J. Burns.
Medical Lake	Thomas Campbell.	Steilacoom	L. R. Rigney.
Montesano	W. H. Blair.	Tacoma	L. E. Sampson.
North Yakima	G. W. Carey.	Vancouver	Hattie Dennison.
Olympia	A. D. Glover.	Waitsburgh	T. H. Jessup.
Palouse	W. D. Irwin.	Whatcom	P. M. Isensee.
Pomeroy	C. A. McCabe.		

In WEST VIRGINIA the Sparrow was reported present, in the autumn of 1886, at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Alderson	1881†	J. N. Alderson.	Mason	1882	Jacob Roush.
Barboursville	1883	F. M. Farrell.	Middlebourne	1883†	L. E. Smith.
Berkeley Springs	1876†	Thomas H. Hodgson.	Milton	1880†	A. D. Neal.
Bethany	1880†	M. E. Brown.	Moorefield	1878†	J. P. Slyer.
Beverly	1881†	S. N. Bosworth.	Morgantown	1880†	A. L. Nye.
Braxton C. H	1883†	Jas. W. Humphreys.	Moundsville	1884†	M. L. Gans.
Buckhannon	1883†	Tom G. Brady.	Newburgh	1880	F. Mortimer Dent.
Do	1881	Dr. J. R. Mathers.	New Cumberland	1876†	L. R. Smith.
Buffalo	....	J. H. Shank.	New Martinsville.	1880†	Ben M. Welch.
Burning Springs	1884†	R. C. Tucker.	Oceana	1884†	F. P. Roach.
Cairo	1881†	Van A. Zevely.	Parkersburgh	1878†	A. N. Williams.
Cameron	1883	Jas. C. Crawford.	Petersburgh	1876†	H. Thalaker.
Charleston	1876†	R. J. Ashby.	Philippi	1876†	D. W. Gall.
Charlestown	1878	George H. Flagg.	Piedmont	1882†	P. J. Rogers.
Clarksburgh	1878	J. Philip Clifford.	Point Pleasant	1881†	F. D. Hoy.
Do	1878	Lloyd Reed.	Princeton	1876†	Z. Fellers.
Coal Valley	1883	J. W. Montgomery.	Quinnimont	1882†	T. S. Maloney.
Elizabeth	1883†	S. B. Sayre.	Raleigh C. H	1885†	J. S. Hull.
Do	1884	Z. E. Thorn.	Ravenswood	1883†	E. C. Smith.
Fairmont	1880†	N. S. Barns.	Ritchie C. H	1884†	Postmaster.
Franklin	1876†	Caddie Mooman.	Romney	....	Jas. Shutz.
Glenville	1880†	William W. Johnson.	Saint George	1882†	William M. Cayton.
Grantsville	1883	John J. Thomas.	Saint Mary's	1881†	George Kelsall.
Guyandotte	1880†	A. E. Smith.	Shepherdstown	1866[?]	D. S. Rentch.
Halltown	1879†	John H. Strider.	Sistersville	1883†	Frank D. McCoy.
Hamlin	1884†	L. R. Sweetland.	Spencer	1883†	Henry A. Smith.
Harper's Ferry	1875	C. B. Wentzell.	Terra Alta	1880†	Dr. S. M. Scott and Jos. Adair.
Hillsdale	1884†	A. K. Parker.	Union	1881	S. R. Watts.
Huntington	1880	Ira R. Wood.	Volcano	1884†	C. M. Magill.
Jackson C. H	1882†	M. D. L. Lewis.	Wellsburgh	1883†	Emma L. Ackison.
Keyser	1876†	E. H. Davis.	Weston	1881†	W. H. Aspinall.
Kingwood	1879	Jas. E. Murdock.	Wheeling	....	Robert Simpson.
Leon	1886†	G. W. Knapp.	White Sulphur Springs.	1880	John F. Garing.
Lewisburgh	1878†	A. Beirne.	Winfield	1882†	Jas. H. Hauly.
Logan C. H	1884†	J. B. Buskirk.			
Madison	1884	William C. Hopkins.			
Malden	1878†	Jas. N. Scott.			
Martinsburgh	1876†	William B. Colston.			

† About.

It was reported not present at the following places in West Virginia:

Locality.	Observer.	Locality.	Observer.
Addison	T. B. Horan.	Ronceverte	J. H. Caraway.
Ansted	O. B. Wills.	Sand Run	Mrs. M. J. Moss.
Clifton Mills	Postmaster.	Wayne C. H	Adkins Chapman.
Hickory	J. H. Shank.	West Union	F. P. Ford.
Peeryville	J. Frank Johnson.		

In WISCONSIN the Sparrow was reported present, in the autumn of 1886, at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Amherst		A. J. Smith.	Mazo Manie	1878†	L. A. Lincoln.
Antigo	1883	W. H. Danley.	Menasha		Curtis Reed.
Bangor	1885†	John Kupp.	Milwaukee (suburb).	1880	Walter B. Hull.
Baraboo	1880†	Matthew H. Mould.			
Beaver Dam	1882†	R. V. Bogert.	Milwaukee		Charles Keeler.
Beloit	1883†	Clinton Babbitt.	Do	1871†	Geoge H. Paul.
Berlin	1870†	D. L. Harkness.	Michicott		N. H. Terens.
Boscobel	1884†	John Pepper.	Montello	1884	Ella J. Cogan.
Burlington	1880†	Charles W. Wood.	New London	1882†	M. B. Patchin.
Chilton	1873†	Jas. W. McCabe.	Oconto	1883†	F. C. Sharp.
Chippewa Falls	1885†	W. W. Crandall.	Oshkosh	1876	A. C. Austin.
Clinton	1879	C. N. Crotsenburg.	Do	1879†	W. F. Webster.
Cumberland	1886	C. F. Kalk.	Do	1881†	A. W. Weisbrod.
De Pere	1870†	E. Van De Casteele.	Peshtigo	1879†	Jas. J. O'Leary.
Dodgeville	1885†	Thomas Rogers.	Pine River	1885†	T. H. Patterson.
Durand	1886	E. L. Brown.	Platteville	1881†	William H. Elgar.
Eau Claire	1883†	Do.	Port Washington.	1872†	Ulrich Landolt.
Elkhorn	1882†	W. D. Lyon.			
Fond du Lac	1877†	S. M. Smead.	Racine	1874†	Dr. P. R. Hoy.
Fort Howard	1875†	George Richardson.	Do	1874†	Clarence Snyder.
Fox Lake	1881†	W. H. Keeney.	Randolph	1884†	John S. Lightner.
Grand Rapids	1885	F. L. Tibbits.	Richland Centre	1880†	J. M. Keys.
Hartford	1876	J. H. Simon.	Ripon	1876	A. Everhard.
Hillsborough	1886	William Lind.	Sauk City	1876†	C. Kuoni.
Janesville	1876†	H. Richardson.	Shawano	1880†	James Miller.
Do	1880†	H. L. Skavlem.	Sheboygan	1878†	Jos. Bast.
Juda	1881†	Jas. A. Patton.	Do	1875	Carl Zillier.
Kenosha		Otis G. King.	Shell Lake	1885†	M. D. Gochling.
Kewaunee	1884†	Ransom A. Moore.	Stevens' Point	1874	G. W. Cate.
Do	1883†	M. Riedy.	Stoughton	1881†	W. W. Gilman.
La Crosse	1884†	Walter Tillman.	Do	1876†	Z. L. Welman.
Lancaster	1883†	S. A. Brow.	Waukesha	1876†	E. Enos.
Lena		R. R. Byram.	Wausau	1880	V. Ringle.
Madison	1873	William Helm.	West Bend	1872	Joseph Ott.
Manitowoc	1875	A. Piening.	Whitewater	1876†	H. H. McGraw.

† About.

It was reported not present at the following places in Wisconsin:

Locality.	Observer.	Locality.	Observer.
Alma	M. W. McDonnell.	La Crosse*	C. H. Burroughs.
Arcadia	George Mathys.	Medford	M. W. Ryan.
Ashland	J. Sullivan.	Menomonie	E. L. Everts.
Cambria	F. B. Ernsperger.	Merrill	W. H. Canon.
Chetek	Postmaster.	Neillsville	Isaac T. Carr.
Clear Lake	J. L. Warren.	Phillips	A. M. Hunt.
Durand*	A. W. Hammond.	Rio	Kennedy Scott.
Do	Miletus Knight.	River Falls	R. McGregor.
Eau Claire*	C. R. Gleason.	Shawano	Mary F. French.
Florence	W. H. Clark, jr.	Stoughton (near)	Z. L. Welman.
Fountain City	John B. Oenning.	Sturgeon Bay	Charles O. Larsen.
Friendship	J. M. Harrison.	Superior	John A. Bardon.
Do	John B. Keyes.	Tail Point Light Station.	George A. Gaylord.
Grantsburgh	Postmaster.		
Hayward	Malcolm Dobie.	Tomah	R. P. Hitchcock.
Hudson	S. C. Simonds.	Viroqua	O. B. Wyman.
Independence	David Garlick.		

* Reported present by another observer.

In WYOMING, in the autumn of 1886, the Sparrow was known to be present at but one point. Alanza A. Bailey states that it appeared at Evanston about 1885; and Dr. R. W. Shufeldt states that in 1877 he saw a flock of five in the streets of Cheyenne. Other observers, however, have failed to find it in Cheyenne, and in October, 1887, there certainly were none there. It was reported non-present in 1887 at the following places in Wyoming:

Locality.	Observer.	Locality.	Observer.
Atlantic City	Robert McAuley.	Green River City	P. J. Hines.
Carbon	F. P. Shannon.	Laramie City	J. H. Donkersley.
Cheyenne City	Frank Bond.	Rawlins	John C. Friend.
Do	A. C. Snyder.	Rock Springs	L. L. Daus.
Fort Bridger	M. E. Carter.		

† About.

In ONTARIO the Sparrow was reported present, in the autumn of 1886, at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Belleville (1884)	1877	Prof. James T. Bell.	Ottawa (1884)	1870†	H. B. Small.
Charlinch		C. J. Tisdall.	Ottawa		W. L. Scott.
Cottam	1880	W. E. Wagstaff.	Pembroke	1874†	E. Odlum.
Dunnville	1875†	Dr. G. A. McCallum.	Plover Mills	1881†	R. Elliott.
Galt	1886	George R. Prescott.	Strathroy	1874	L. H. Smith.
Hamilton (1884)	1874†	Thomas McIlwraith.	Toronto (1884)	1875†	J. B. Williams.
Hyde Park	1880	H. Keays.	Toronto (1888)		Dr. William Brodie.
Listowel	1877†	William L. Kells.	Trenton	1879†	Charles McLellan.
Mildmay	1878†	W. A. Schoenau.	Yarker	1877†	John Ewart.
Oshawa	1876†	W. J. Stevenson.			

† About.

In QUEBEC the Sparrow was reported present, in the autumn of 1886, at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Godbout	1884†	Napoleon A. Comeau.	Montreal	1870†	Ernest D. Wintle.
Montreal		George J. Bowles.	Quebec (1884)	1864†	Col. Wm. Rhodes.

About.

In NEW BRUNSWICK the Sparrow was reported present, in the autumn of 1886, at the following places:

Locality.	First appeared.	Observer.	Locality.	First appeared.	Observer.
Chatham	1880†	Dr. Jas. Baxter.	Saint John	1883†	Montague Chamberlain.
Fredericktown	1876†	C. W. Beckwith.			
Petitcodeac	1886	John Brittain.	Wickham	1886†	D. W. Pilkington.
Portland	1883†	J. W. Banks.	Woodstock	1884	John Stewart.
Sackville	1885†	T. A. H. Mason.			

† About.

It was reported not present at the following places in New Brunswick:

Locality.	Observer.	Locality.	Observer.
Dalhousie	H. A. Johnson.	Oak Point	Gibson Williamson.
Eel River	Marshall Reid.	Woodland's Cove	F. S. Cheny.

In NOVA SCOTIA the Sparrow was reported present, in the autumn of 1886, at the following places:

Locality.	First appeared.	Observer.
Halifax (1884)	1875†	J. Matthew Jones.
Kentville	1881	T. A. H. Mason.
Two Rivers		B. B. Barnhill.

It was reported not present at one place in Nova Scotia: Prof. A. H. Mackay states that it was not present at Pictou in the autumn of 1886.

In PRINCE EDWARD ISLAND the Sparrow was reported only from Charlottetown, where Francis Bain saw half a dozen January 10, 1887.

It was reported not present at the following place in Prince Edward Island:

Locality.	Observer.
Alberton	James Hunter.
Alberton	J. Hunter Duvar.

In the autum of 1886 the Sparrow was not known to have reached any of the towns in MANITOBA or NORTHWEST TERRITORY.

It was reported not present at Winnipeg by A. McArthur and L. H. Smith, and at Qu'Appelle by George F. Guernsey.

RATE OF INCREASE; CHECKS, NATURAL AND ARTIFICIAL.

The testimony relating to the rate of increase of the Sparrow and the checks which affect such increase more or less, is by no means as full and specific as could be desired, and its character is such as to preclude the possibility of summarization. The following replies, selected from upwards of two hundred received, will serve to show the general character of the whole.

California.—*San Francisco.* F. Gruber: On the average it raises two broods a year, and five or six young to a brood. In some instances three broods are raised, and rarely seven to eight young. (March 5, 1885.)

Connecticut.—*New Haven.* Louis B. Bishop: A single pair will rear in a season four or five broods, aggregating twenty or thirty young. (August 23, 1886.)

New Haven. Robert D. Camp: I have seen four broods raised in a single season. (April, 1887.)

District of Columbia.—*Washington.* Walter B. Barrows: On the evening of August 11, 1887, the city was visited by a short but severe thunder-storm, which proved very destructive to English Sparrows. The rain began to fall about an hour before sunset, and in little more than an hour the precipitation amounted to more than an inch. It was accompanied by a high wind, which in some parts of the city was strong enough to twist off or uproot a few shade trees. A second but lighter shower, without much wind, occurred during the night. On the following morning it was found that hundreds, perhaps thousands, of Sparrows had perished in this city alone. A large proportion of the Sparrows which are not nesting (mainly young ones) pass the night together in large companies, frequently congregating to the number of five hundred or a thousand in some large tree or group of trees where they resort regularly. Under such a group of trees, near the main entrance of the Smithsonian Building, two hundred and fifty-four dead Sparrows were picked up, and later in the day it was learned that one hundred and twenty were counted beneath another group of trees near the eastern entrance of the National Museum.

At a large roosting place in the Agricultural Grounds the destruction seems to have been even greater, but most of the dead birds were carried away before being counted. Several persons were seen collecting them in baskets or bags, and as the last man carried off nearly a peck (probably one hundred or one hundred and twenty-five birds), there is little doubt that three hundred or four hundred Sparrows were killed at this roost alone.

Thus far no birds but English Sparrows are known to have been killed by the storm, but this is easily accounted for by the fact that the English Sparrows in this city probably outnumber all other birds at least 500 to 1. It is also worth noting that the great majority of those killed were young of the year, although perhaps two or three per cent. were old birds.

The cause of death is somewhat doubtful: Mr. Ridgway, ornithologist of the National Museum, believes that the Sparrows roost together in such numbers that many of them are compelled to put up with tips of branches or small twigs, where they are whipped about by the wind and finally beaten to the ground and actually drowned. It seems more probable, however, that while some may be killed in the manner described, the majority die from cold; for the feathers once wet, the birds are unable to keep warm, and the chill, together with the exhaustion caused by the struggle with wind and rain, is too much for them. About a year ago a similar storm occurred here, and on the following morning Mr. Ridgway found 50 or 60 dead Sparrows beneath one tree on the Agricultural grounds. (August 13, 1887.)

Since the above was written, it has been learned that the recent storm was very destructive to Sparrows both at Baltimore, Md., and Jersey City, N. J. An account of the destruction at the latter place will be found on page 236, under the head of Jersey City. (September 14, 1887.)

Washington. Michael Durkin, gardener at the navy-yard: We have used rice and bread, wet and then sprinkled with arsenic, to feed the Sparrows, and many have been killed in this way. We have also paid boys to pull down all the nests that could be reached, but thus far little change seems to have been made in the number of Sparrows. (August 22, 1887.)

ILLINOIS.—*Bernadotte.* Dr. W. S. Strode: The northern shrike has appeared here in unusual numbers, and seems to be giving its atttention mainly to this Sparrow. I frequently notice one among the evergreens and shrubbery back of my office, in the center of the town, in active pursuit of these little vagrants. (December 6, 1887.)

Centralia. Jabez Webster: No means of restriction has been taken, but in cold weather the boys have killed them by scattering "tailings" from a fan-mill and then shooting into a flock, and have also caught them with a large sieve-trap. (December 21, 1886.)

Chicago. H. K. Coale: The northern shrike (*Lanius borealis*) feeds on them all winter. Many Sparrows freeze in very cold winters. (August 21, 1886.)

Monmouth. Dr. S. M. Hamilton: The jay is one of the Sparrow's worst enemies here. It destroys many nests, and kills the young birds or eats the eggs. (September 24, 1886.)

Quincy. J. H. Richardson: In 1870 six pairs were brought to this city, and it is estimated that the progeny of these few now number tens if not hundreds of thousands. (October 4, 1886.)

Rockford. Dr. F. H. Kimball: I have not observed many Sparrows more than a mile from the city, although occasionally a few may be seen 4 or 5 miles out. I observed a single pair nesting in the cornice of a building in July, 1878. They raised two broods that season. During the next three years they multiplied very rapidly, or we received a fresh importation, for at the beginning of the winter of 1881–'82 there were hundreds here, but about three-fourths of them were destroyed by the cold weather of that winter. Although many have been destroyed by subsequent winters, the destruction has never been so general since. Whenever we have a hailstorm large numbers are killed. After one such storm, accompanied by lightning, this last summer over a half bushel of dead Sparrows were found under a few trees in a single yard. I noticed a sparrow-hawk within a few days hunting Sparrows in a thickly-settled portion of the city. Owing to the many checks, Sparrows do not seem to have increased during the last two seasons. (September 28, 1886.)

New Albany. James N. Payton: Last winter was an exceedingly cold winter, and many Sparrows froze to death or were starved out. (September, 1885.)

INDIANA.—*Indianapolis.* J. G. Kingsbury: No means in a public way has been taken to restrict its increase. A man living here traps large numbers to sell to marksmen for sporting purposes, but the thousands he takes at the grain elevators make no perceptible diminution in the crop. (August 18, 1886.)

IOWA.—*Burlington.* Howard Kingsbury: One pair under my observation raised three broods, aggregating nine birds, and two of the eggs were removed. (December 28, 1886.)

Corydon. J. S. Whittaker: One observer on a farm 5 miles from town says they are in his barn, get in through a knot-hole, and when outside are sometimes attacked by his doves and driven in again. (October, 1886.)

Dubuque. Edward T. Keim: A petition to the city council, asking for the extermination of the Sparrow, was generally signed. (August 19, 1886.)

KANSAS.—*Topeka* F. W. Giles: No means has been taken to restrict their increase here; but, being entirely left to care for themselves, many perish in winter storms, and many from depredations of the blue jay, while the insufficiency of nesting places is a great hinderance to their increase. There has been no perceptible increase of Sparrows in Topeka for the last five years. (October 6, 1886.)

KENTUCKY.—*Bowling Green.* Postmaster: Some have been shot, and one or two successful efforts have been made to poison them with strychnine mixed with dough, but the danger of this method has restricted its use. (October 3, 1886.)

Lancaster. W. H. Wherritt: They were greatly thinned out in this vicinity by the exceptionally cold winters of 1884–'85, and 1885–'86. (October 11, 1886.)

Taylorsville. Ruth C. Burton: Many perished from the severe cold last winter. (October 30, 1886.)

LOUISIANA.—*Schriever.* Postmaster: No means whatever has been taken to restrict the increase of Sparrows here. They are so plentiful that they can not be destroyed. (October 8, 1886.)

MAINE.—*North Livermore.* George H. Berry: To-day I found a thorn bush in which was a nest of a shrike (species not determined) containing four young. Impaled on the thorns were numbers of large insects (mostly grasshoppers), a few mice, a small green snake, and quite a number of birds, among them a red-eyed vireo, a couple of chipping or bush sparrows, an indigo bunting, and seven English Sparrows. Under the tree, or rather clump of trees, were the bodies of three more English Sparrows. I think the shrike, where found, is fully as good an agent as any in effecting the destruction of the English Sparrow. (December 20, 1887.)

MARYLAND.—*Baltimore.* Otto Lugger: The only means taken to restrict its increase is the destruction of its eggs in the parks. (May 10, 1887.)

Baltimore. Dr. A. P. Sharp: The rapidity of their increase is wonderful; three to four broods a season, and the young or spring birds hatch out a brood the same season, before fully grown. The old birds begin to lay very early in the spring and keep it up late in the fall. I usually leave the country about October 1, and before doing so destroy all the eggs, often five in a nest. I have a number of boxes within easy reach, and when they build in them I usually wait until the young are nearly ready to leave the nest, and then give my cats a feast of them. I sometimes kill from four to six birds by baiting for them in my chicken yard with wheat or rye. There ought to be a law passed to compel every farmer to present to the county clerk a certain number every season in part payment of his tax bill, so as to keep down their rapid increase. (February 16, 1887.)

The Sparrows know me as well as my dogs, and I can not get near them. They have the keenest hearing of anything I know. The cock of the gun drives them in every direction, even when I cock inside of the house with shutters partly closed. It is impossible to get a shot at them outside. I formerly killed a good many, but now have tried every means to feed them. They will eat with the chickens, seeming to know that I will not shoot them. (February 29, 1887.)

Sandy Spring. H. H. Miller and other members of county farmers' club: At a meeting of the Montgomery Farmers' Club held on the 13th instant, the following resolution was unanimously passed: *Resolved,* That, in the opinion of this club, the English Sparrow is an unmitigated evil, and should be fought incessantly until driven out of the country. (February 16, 1887.)

MASSACHUSETTS.—*Cambridge.* William Brewster: It rears three broods yearly at least; twelve young yearly to a pair would not be an overestimate. A few are killed by boys with stones, "catapults," etc., but the number so destroyed is inconsiderable. Fire-arms can not be used within our city limits, and the Sparrow can not be easily trapped. No bounty has been offered here, but one has been paid this year, I understand, in the neighboring town of Waltham. (January 30, 1884.)

MICHIGAN.—*Ann Arbor.* Israel Hall: Inasmuch as the depredations of these birds are universal, the effort and expense of their extermination should be national and simultaneous. The birds being the adjuncts of high civilization, will be found in cities and villages in about the proportions of their respective populations. Therefore, I will suggest that you try experiments by feeding wheat that has been saturated in a solution of arsenic. If this be effectual, procure a commission with power to purchase and saturate, in every city and village, such quantity of wheat as will be needed to scatter in the streets during February, when the birds are starved and frozen to the least numbers. If this be discreetly done, I think the birds will be exterminated in the course of three winters. (June 10, 1887.)

Flint. John Campbell: So far as Genesee County is concerned, the bounty on Sparrows has amounted to nothing. I have paid for such purposes, since the law took effect, $1.02 and that to one person, who had killed the birds more for sport than for the bounty. In my opinion the bounty will have to be increased materially before it will be much of an inducement for men or boys to spend their time in destroying the birds. (April 9, 1888.)

Homer. C. F. Collins: The hard winter of 1885–'86 nearly destroyed these birds in this section. I do not think there are more than about one hundred here now. (October 8, 1886.)

Ionia. J. Warren Peake: In my opinion the bounty law of 1887 has been a total failure in this county. More heroic measures will have to be adopted or the Sparrows will continue to increase. (March 30, 1888.)

Manistique. W. H. Hill and Corwin Adkins: The winters are very long and cold on this upper peninsula, and a good many Sparrows die each winter. (October 28, 1886.)

Mason. W. D. Longyear: It is my opinion that the passing of the act for the payment of bounties has not reduced the number of Sparrows in this county enough to be discernible, although there have been some Sparrows killed. One reason why I think there have not been more killed is that the bounty is so small that any person who undertakes to kill twenty-five Sparrows will give it up before he secures the required number. (March 30, 1888.)

Port Huron. William Burns: In this county act No. 29 of the laws of 1887 has not been efficacious in reducing the number of Sparrows. It seems to be generally conceded that the bounties are too small. Also people in the township consider it an additional annoyance to have to apply to the county for payment. If the bounties were increased, and paid by the several townships instead of the county, I think it would be more of a success. (March 30, 1888.)

Sparta. E. Bradford: No means has been taken for its restriction except that every one who can, shoots them. One man here has shot about three hundred during the past summer. (October, 1886.)

Tecumseh. C. A. Wright and C. A. Story: A few farmers have been shooting them, which drives them away for the time being. (October 11, 1886.)

Traverse City. Charles Burmeister: I learn that at a regular meeting of the village council of Traverse City, held on February 7, 1887, it was voted that "Mr. Morgan and Mr. Barnes are appointed a committee to exterminate the Sparrows in the village." (Frankfort, Mich., February 9, 1887.)

MINNESOTA.—*Minneapolis.* Dr. Thomas S. Roberts: No means of restriction has been taken here. The severe winters and late springs seem to have effectually kept them in check. Although the first flock came here in the fall of 1876, they have increased very slowly and even now there are but two or three little parties of them in the city. (November 16, 1886.)

Rochester. W. D. Hurlbut: They first appeared here in November last and seem to be as much at home as if raised here. This unusually cold winter does not seem to discourage them, none having died that we know of. The German and English residents assure me these birds will thrive here as well as anywhere in Europe. Some people, especially Germans, are inclined to welcome and feed them. (January 27, 1887.)

The English Sparrows, which mutiplied greatly during the past summer, and were probably re-enforced by fresh colonies, have not appeared to suffer at all from this unusually severe winter. No very bad weather is ever observed here after this date, and I may therefore conclude that they are acclimated and fully established. During the worst weather they housed in the coal sheds and under the eaves of the grain warehouses. (January 31, 1888.)

MISSOURI.—*Carrollton.* M. R. Gittings: One gentleman who takes quite an interest in birds says that two years ago he noticed five or six Sparrows here, and now there are seventy-five or one hundred. (November 19, 1886.)

Dixon. W. W. Howard: In the winter of 1884 I first noticed about four birds, and they have increased to about forty at the present time. (November 12, 1886.)

Memphis. J. P. Craig: It first appeared here three years ago this fall, and has multiplied until now there are thousands. (November 12, 1886.)

NEBRASKA.—*Blair.* W. H. Eller: There were two pairs here in 1885, and as many as sixteen birds were seen at one time a few weeks ago; but seed soaked in strychnine was used, and twelve of them were killed. There are four here now. (November 11, 1886.)

Plattsmouth. J. N. Wise: They have been here about twelve years, but are not abundant, and not troublesome in this vicinity. Their increase is scarcely perceptible. (November 22, 1886.)

NEW HAMPSHIRE.—*Portsmouth.* Sarah H. Foster: No effort has been made to destroy the Sparrow, as it is protected by law. Three years ago a petition, numerously signed, was sent from Portsmouth to Concord, asking to have the game law altered in this respect, but not being properly presented it was not acted upon. (April 2, 1884.)

NEW JERSEY.—*Caldwell.* Marcus S. Crane: Three broods were raised this year in a box near our house. (September 20, 1884.)

Haddonfield. Samuel N. Rhodes: I think last year the law protecting them was repealed by the legislature. This is indirectly destructive to the Sparrow, but of no avail against increase. (September 9, 1886.)

Jersey City. Jno. T. Bragaw: A storm passed over the city on the evening of the 11th day of August, accompanied by a severe gale and a great downfall of rain. On the following morning I had occasion to pass by one of the parks of Jersey City, Van Vorst Square, and was greatly surprised to see a large number of dead Sparrows on the walks and in the grass of said park. The inclosed article, clipped from the Jersey City Journal of August 12, 1886, gives a more minute description of the great destruction of Sparrows:

"* * * The sight presented in the pretty park would have delighted those who are determined to do away with the Sparrow nuisance. Piled in a heap near the fountain the reporter saw over four hundred dead Sparrows. Constant additions were being made to the mass by boys who were scouring the lawns in search of dead birds. The park-keeper stated that two wheelbarrow-loads of dead Sparrows had already been gathered up and taken away. There must have been nearly one thousand five hundred deaths in the Van Vorst Park Sparrow colony last night.

"Exactly what caused this mortality is unknown. Policeman Sturgis stated that when he locked the park gates last night hundreds of Sparrows that had been thoroughly drenched by the storm were hobbling about the paths. There were a lot of cats about, and the felines could be seen seizing Sparrows in all directions. When Sturgis returned to the park this morning dead birds were lying about in all directions. Under a large willow tree that had lost a big limb in the storm twenty-eight dead birds were found. The paths and lanes were sprinkled with tiny feathered carcasses in all directions. * * * There are very few live Sparrows in the park to-day, and they are unusually quiet and subdued." (August 23, 1887.)

Passaic Bridge. F. M. Carryl: I manage to kill one or two a day the year round, but it seems to make no difference. (August 20, 1886.)

Woodstown. Jas. D. Lausen: It breeds monthly. One pair now has three young in the nest. (August 18, 1886.)

NEW YORK.—*Highland Falls.* Dr. Edgar A. Mearns: They are shot by farmers and gardeners. Grape producers hire boys to shoot them. (February 27, 1884.)

Northport. William Crozier: I do not allow them to be destroyed on my farm. I wish we had more of them, for I consider the species a most valuable one. (August 26, 1884.)

Phœnix. Benjamin F. Hess: The first Sparrows, a single pair, came to our farm in the spring of 1884, and to-day undoubtedly one hundred can be seen about the trees and buildings. (August 25, 1886.)

Rochester. H. Roy Gilbert: It rears three broods yearly. Eggs can be got at any time. (August 20, 1884.)

Utica. Thomas Birt: The English Sparrows, which were to be seen in flocks of hundreds previous to the cold snap, have dwindled down to a dozen or two in a flock, or even less. Would that the past cold month had exterminated the pest altogether. (February 4, 1888.)

OHIO.—*Akron.* Ferdinand Schumacher: They have increased a thousandfold during the ten years of their presence here. (October 25, 1886.)

Cleveland. Dr. E. Sterling: Outside the city gardeners and fruit-growers shoot them on sight. (February 25, 1884.)

Columbus. William B. Alwood: They have increased very rapidly for some years, but I can not see that there has been any noticeable increase during the past year. No means has been taken to restrict their increase, except shooting when they become troublesome on wheat-fields. I have been told by different parties that they destroyed Sparrows very successfully in winter by feeding them poisoned grain. (July 16, 1887.)

New Athens. T. M. Sewell: It first appeared here in 1882, and was most abundant in 1885. Great numbers were destroyed by hail this present season. (November 11, 1886.)

Newton Falls. E. W. Turner: They are breeding so fast in our large towns that during the last two years they have invaded the country and done incalculable damage. (November 16, 1886.)

North Bend. R. H. Warder: There is constant destruction of nests and eggs here. (November 27, 1886.)

Portsmouth. S. R. Ross: About twelve years ago our city council imported two pairs of Sparrows for our city park, and from these the city is overrun with the increase, and they are also finding their way to the adjoining farms and villages. (September 2, 1886.)

South Salem. W. N. Irwin: The screech owls are working on them very industriously, and many of the Sparrows have perished by being frozen in the eave-troughs around buildings, as they will roost in the troughs, and if any water is in the bottom they freeze and starve. (December 26, 1887.)

Wadsworth. Dr. J. F. Detweiler. No hunting is more acceptable to farmers in this vicinity than a Sparrow hunt, and these are quite common here, and result in the destruction of great numbers of Sparrows. Inclosed you will find an account of one of these hunts. The man that shot three hundred had fed the birds in sheep-troughs for some time. When the trough was lined on both sides he raked them, killing at one shot sixty-one birds. (January 11, 1888.)

The item here alluded to is as follows:

"*The great Sparrow hunt.*—Monday was a cold day for English Sparrows. About one thousand departed for the 'sweet by and by.' The hunt was exciting, and the 'bang' of the double-barrel shotgun and old flint-lock could be heard at all times during the day. Some of the hunters scored goose-eggs, but the scores were generally creditable. Lewis Heiser was the champion shot, killing three hundred birds. The boys said he had a Gatling gun and a few dynamite cartridges. Jake Kreider came next with one hundred and forty-five. Eli Brouse killed one 'poor Sparrow.' Kreider's side had three hundred and ninety-six of a majority." * * *

[The grand total was nine hundred and eighty.]

PENNSYLVANIA.—*Allentown.* W. B. K. Johnson: I have tried various poisons, and find that crystallized arsenic is too slow. As soon as they detect anything they disgorge the food from their crops. Strychnine kills them, but it is seldom that I can get them to take it on account of its bitterness. I have tried seeds, grain, and bread crumbs with but partial success, and then only when a snow-storm covered up all other food. Some winters I may have killed two hundred or perhaps three hundred, but this winter I have killed scarcely fifty. They are too cunning to go into traps, as I have tried that. If you can tell me of the best method of exterminating them I should be very thankful. (February 7, 1888.)

Collegeville. C. Augustus Rittenhouse: Boxes are being removed wherever the Sparrow builds. The bird is a curse to the country, and there should be a reward to the pei on killing the most in a year's time. Perhaps this would be the quicker way to rid the country of the pest. (August 18, 1886.)

TENNESSEE.—*Decatur.* I. C. Arrants: About three years ago they were first noticed in small numbers in the grove surrounding the court-house, but now they exist in swarms all over the town. (November 13, 1886.)

UTAH.—*Pleasant Grove.* Mrs. P. Sterrett: It has become a great nuisance to farmers and gardeners. Our barns and sheds are filled with nests, and they increase rapidly. (November 11, 1886.)

Provo City. Daniel Graves: I learn that in Salt Lake the city fathers are giving a premium for its destruction, and the same is being talked of in this city. (November 16, 1886.)

VERMONT.—*Lunenburgh.* Dr. Hiram A. Cutting: There is no law to protect them. Cats catch them here as fast as they increase. (September 5, 1886.)

Rutland. Jenness Richardson: I have notes of two broods in winter and three in summer. There are from four to seven young in a brood. They are destroyed mainly by the northern shrike; in 1880 they were nearly exterminated by this bird. (February 8, 1884.)

WEST VIRGINIA.—*Cameron.* Jas. C. Crawford: They first appeared here in 1883, and at present their numbers are estimated in the thousands. (November 12, 1886.)

Halltown. John H. Strider: Our town authorities have given the boys a bounty of two cents per head for them, but they are spreading in the country, and nothing but a general war on them simultaneously will do any good. (September 6, 1886.)

WISCONSIN.—*Janesville.* H. Richardson: The little birds suffer excessively from our cold winters, but they increase so fast during the summer that their number keeps up. (November 12, 1886.)

Kenosha. Otis G. King: The last winter killed off a great many, but this fall there is a full supply again. (November 12, 1886.)

Ripon. A. Everhard: At one time it was very abundant here, but a hard winter killed a great many, and since then they have not increased very fast. (November 18, 1886.)

Sheboygan. Carl Zillier: Three pairs were brought here from Germany in 1875, and they have multiplied so that now there are millions of them here and in the surrounding country. (November 15, 1886.)

CANADA. ONTARIO.—*Strathroy.* L. H. Smith: The Sparrow stands our winter well, although I have seen him with the thermometer at 20° to 30° below zero fluffed out like a ball of feathers, and wishing, no doubt, notwithstanding earthquakes, that he were in Charleston, S. C. (October 11, 1886.)

Yarker. John Ewart: The winters are too severe here for the Sparrows to become very numerous. I have never found any myself that were frozen, but another party found quite a lot which had been frozen in an unused grain storehouse; also some in a shed attached to the grist-mill in this place. I have also noticed a marked decrease in their numbers after a cold dip, but of course that may be caused by a move south. (November 19, 1886.)

NEW BRUNSWICK.—*Fredericton.* Charles W. Beckwith: The English Sparrows are not yet a nuisance here, and unless they increase more rapidly than at present are not likely to become troublesome in the future. They winter here, but each spring the colony is largely reduced from cold; by autumn, however, they appear to have increased to the original numbers. (October 8, 1886.)

IRELAND.—*Dublin.* Percy Evans Freke: With regard to the destruction of this pest, I hope you will allow me to offer a suggestion. In cases where vines are trained over any flat surface, such as the wall of a house, they afford the best possible Sparrow traps. Not only in the nesting season, but also in winter they will, if evergreen, become the roosting place at night of armies of Sparrows. Then a large net spread between two poles, should be laid against the vines, which should be then beaten with long rods. Lanterns, raised if necessary on poles, should be held before the net. The birds fly from the vines toward the light and are caught in the net, or flutter down to the bottom of it, which should be turned up inward to receive them.

In this way numbers of adult Sparrows may be destroyed. The nests can of course always be taken. I fear, however, it will be found impossible to get rid of them altogether. A few will always survive, and will again increase rapidly. (October 1, 1887.)

ENGLAND.—Sparrow clubs are formed in the old country, each member being required to show a given quota of heads each week or month. Farmers pay their boys so much a dozen for eggs, young, and old birds. We used to poison them also with poisoned wheat till stopped by law on account of the wholesale destruction of other birds. Nets and every device were used to take them; a favorite one with myself and with all boys was, and still is, to take a lantern on a dark night under a thatched shed where the Sparrows slept. One boy drove them out with a pole, while three or four others stood round the lantern in a corner, and caught them in their hands. (David H. Henman, Willows, Griggs County, Dak., December 12, 1886.)

INJURY TO BUDS, BLOSSOMS, AND FOLIAGE OF TREES AND VINES.

In reply to the question, *Does the Sparrow injure shade, fruit, or ornamental trees or vines?* five hundred and eighty-four replies were received, of which three hundred and forty-nine were extremely brief, and may be summarized as follows:

	Reports.		Reports.
No	161	Not as a rule	3
Think not; believe not	56	Only by driving off other birds	2
Not to my knowledge	36	Only by roosting and nesting in them	14
Not so far as observed	15	No complaint heard	1
Not here; not yet	7	Does not injure trees	18
Not much	5	Yes	17
Not materially	3	To some extent	4
Not seriously	3	Said to do so	1
Not to any extent	3		

The remaining two hundred and thirty-five reports are, for the most part, much more full and specific. It is impossible to summarize them satisfactorily, but they may be classified as follows:

	Reports.
Wholly favorable to the Sparrow	7
Wholly unfavorable to the Sparrow	213
Partly favorable and partly unfavorable	15

The following examples of these reports will give a fair idea of the character of the whole:

CALIFORNIA.—*Berkeley.* C. H. Dwinelle: It is accused in California (and I believe rightly) of denuding trees of their fruit-buds to a very serious extent. (Brooklyn, N. Y., December 4, 1886.)

CONNECTICUT.—*Middletown.* Walter B. Barrows: A few doors from my house a colony of Sparrows has taken possesion of an English ivy which covers the entire north side of a brick house. Upwards of fifty pairs nest in this vine, and although their nests have been pulled down more than once, several wheelbarrow-loads at a time, their numbers still increase. The ivy has become filthy, ragged, and unsightly; and, unless some more effective means are taken, its ultimate destruction is only a question of a year or two more. The ivy on the chapel of the Divinity School has also been seriously injured, and the building disfigured in the same manner. (July, 1886.)

Norwich. S. T. Holbrook: They build in and deface vines on churches and private dwellings. I have seen from seventy-five to one hundred nests on one vine, entirely destroying its appearance. (August 16, 1886.)

Stratford. Robert W. Curtiss: I saw quite a flock at work in a pear tree early last spring, and shot three of them. I opened their crops and found buds in all, but so mutilated that I could not tell whether they were fruit-buds or wood-buds. (October 11, 1886.)

DISTRICT OF COLUMBIA.—*Washington.* S. M. Clark: My grape-vines are easily accessible, but I have never noticed the Sparrows among them. They will pick off peach and pear buds and young blossoms, but they eat only a portion of them, dropping the most on the ground. (January 11, 1886.)

GEORGIA.—*Lawtonville.* Postmaster: It is very destructive to apple trees, feeding on the bloom in the spring; but as yet it is not here in sufficient numbers to do much damage. (October 4, 1886.)

ILLINOIS.—*Chicago.* B. T. Gault: For two seasons these pests have almost stripped our grape-vines of their fruit; first, by eating the fruit-buds in the early spring, and, later, by eating whatever blossoms may have been put forth after the first raid. (October 29, 1885.)

Monmouth. Dr. S. M. Hamilton: I have never seen the least bit of injury done by the Sparrow to trees and vines. (September 24, 1886.)

INDIANA.—*New Albany.* John B. Mitchell: It injures fruit trees by eating the buds, and disfigures other trees by roosting in them. (October 6, 1886.)

IOWA.—*Davenport.* Davenport Academy of Natural Sciences, per W. H. Pratt, curator: The fruit-growers are afraid of the Sparrow, but so far as actual knowledge goes here it scarcely seems to do much injury, except by soiling roofs, trees, fruit, and vines. (April 20, 1887.)

Des Moines. C. R. Keyes: It has been reported from Iowa City as doing injury to ornamental or shade trees, but I have watched them for the past two winters, and have had a large flock roost every night in the trees in front of my window, and they have done *no* injury *whatever.* (February 27, 1887.)

Iowa City. C. C. Nutting: It is injurious to cedar and pine trees. The injury is caused by a habit they have of roosting in flocks in some particular tree, often a pine, and rendering it unsightly by their litter. Their nesting habits result in disfiguring trees. Although these habits may not seriously injure the vitality of the tree, they certainly injure its usefulness for ornamental purposes. I am also informed by a trustworthy observer that they eat the buds of the pine. (January 18, 1887.)

KANSAS.—*Netawaka.* John H. Johnson: I have seen the Sparrow destroy fruit-buds of both vines and trees. (February 18, 1887.)

KENTUCKY.—*Crescent Hill.* Thomas S. Kennedy: It does not injure the trees or vines, but it plucks the fruit-buds in the spring. (October 5, 1886.)

LOUISIANA.—*Donaldsonville.* L. E. Bentley: The Sisters of Charity in charge of the St. Vincent Institute at this place lost an ornamental or shade tree, and attribute its death to the injury inflicted by a flock of Sparrows which nested or roosted in it. This is the only instance of the kind of which I have heard. (October 30, 1886.)

MASSACHUSETTS.—*East Templeton.* Charles E. Ingalls: I have seen them in winter stripping the buds from pear trees, and from ornamental trees along our village streets. (August 23, 1886.)

Medford. John Ayres: It never, to my knowledge, injures trees in any way. (May 29, 1884.)

Mount Auburn. M. Abbott Frazar: It buds pear trees, but in large orchards and on a bearing year this is to the advantage of the trees, as it removes but a portion of the surplus fruit which would otherwise have to be picked off. A single tree in a city back-yard very likely would be stripped, rather overdoing the business. (Autumn, 1885.)

Springfield. Dr. P. L. B. Stickney: It is continually picking at the blossoms and buds of trees and vines early in the season. (October 18, 1886.)

Taunton. H. G. White: During winter the Sparrow bites off the buds of many trees and lets them fall to the ground untouched. (February 25, 1886.)

MICHIGAN.—*Bay City.* F. W. Grinnell: It does not injure trees or vines very much; in spring it takes buds from apple and pear trees. (December 4, 1886.)

Eaton Rapids. S. R. Fuller: It eats the young buds from the maples where it gathers in large flocks. (October 11, 1886.)

Mount Clemens. Jno. B. Leonardson: It nests in evergreens and deadens their tops; and it eats the fruit-buds of the grape-vine in early spring, also the buds of the apricot to a greater extent. (August 29, 1886.)

Springport. J. B. Conklin: It does not seriously injure trees or vines. Evergreens, being favorite roosting-places, are left in a filthy condition, especially in winter. (October 6, 1886.)

NEW JERSEY.—*Blawenburgh.* David C. Voorhees: It picks the germs from the buds of fruit trees at the time of blossoming. (December, 1885.)

Caldwell. Marcus S. Crane: My friend, Mr. William Davenport, tells me he has seen it picking to pieces pear and peach blossoms. (February 19, 1884.)

Freehold. D. D. Denise: It picks the blossoms from fruit trees. (September 2, 1886.)

Haddonfield. Samuel N. Rhodes: It injures fruit buds; but on my farm and in small villages the destruction is slight. (September 9, 1886.)

Merchantville. Edward Burrough: It injures fruit buds. I have detected it this spring eating the buds on a Bartlett pear tree, and also on the white elm. I have frequently heard them charged with this habit, but never caught them at it before. (May 16, 1887.)

Passaic Bridge. F. M. Carryl: I have seen it take buds of the plum, apple, and quince trees, and have found them in the stomachs of birds shot. (August 26, 1886.)

NEW YORK.—*Binghamton.* H. J. Gaylord: It destroys everything it comes in contact with. It is very destructive in the fruit orchards in the early spring, eating fruit buds from the plum and cherry trees. (September 26, 1885.)

Clyde. William M. McLachlan: I have observed it destroying the fruit buds of the pear, and I have seen it on my currant bushes. (May 15, 1884.)

Dobbs Ferry. Dr. C. B. McQuesten: They pick off the budding flowers of the apple and pear trees and the budding leaves of the maples. (October 8, 1886.)

Geneva. C. S. Plumb: It picks out the buds of plum and pear trees in early spring, before they have started to any extent. (August 28, 1886.)

Rochester. P. C. Reynolds: It sometimes picks off buds of the pear and cherry before they open in spring. (September 2, 1886.)

OHIO.—*Akron.* Prof. E. W. Claypole: I have not observed it to injure trees or vines, but testimony on this point is contradictory. (December 31, 1886.)

Avondale. Charles Dury: Four Sparrows examined March 25, 1885, were full of tree buds; these were shot out of a flock in a cherry tree near home. (February 3, 1886.)

Burton. P. W. Parmelee: It injures grape blossoms. (September 1, 1886.)

Cleveland. L. M. Davies: I have seen it picking buds from an apple tree in our yard in the spring, and am sure it was not "after insects." (November 1, 1886.)

Marietta. Dudley S. Nye: Fruit-growers condemn them as injuring fruit buds. (November 25, 1886.)

Oxford. L. N. Bonham: It eats the first spring buds of fruit trees and vines. (Columbus, Ohio, November 30, 1886.)

Saint Clairsville. T. W. Emerson: It roosts, and even nests, in climbing vines in such numbers as to make them nuisances instead of ornaments. (March 2, 1887.)

PENNSYLVANIA.—*Berwick.* Dr. A. B. McCrea: Before the early vegetables are above ground he will destroy the fruit buds, often doing considerable damage. (September 1, 1885.)

Berwyn. Frank L. Burns: I have seen it pick off buds from the apple trees when other food was scarce. I have also found buds of plants in its stomach in winter. (1885.)

Chambersburgh. Davison Greenawalt: The English Sparrow is the only bird I ever knew to do any damage to buds or foliage. Peach, pear, and apple trees are the ones most damaged. (February, 1884.)

Lancaster. Dr. S. S. Rathvon: I have it from an intelligent fruit-grower and nurseryman (Mr. Daniel Smeych) in this city, that they destroy the young leaves and flower buds of fruit trees and grape-vines in early spring. (October 8, 1886.)

Landis Valley. H. K. Landis: It has been observed to feed on the buds and foliage of trees. It destroys the blossoms of peach trees. (September 8, 1885.)

Waynesborough. E. B. Engle: I have seen them pull off the buds of peach, plum, and cherry trees in winter and early spring. (August 30, 1886.)

Willow Street. Dr. I. H. Mayer: It attacks and injures the buds of grape-vines and fruit trees, especially the blossom buds. (January 31, 1885.)

Rhode Island.—*Westerly.* Byron J. Peckham: I have seen it eating fruit buds, but do not think its ravages are extensive in this line. (February 20, 1884.) I observed it this spring picking off the blossoms of our cultivated cherries to a large extent. (1885.)

Vermont.—*Lunenburgh.* Dr. Hiram A. Cutting: It does not usually injure trees, but I saw one instance where they nested so abundantly in a hedge that it was injured. (August 19, 1884.)

Saint Johnsbury. Rev. Henry Fairbanks: It works upon some buds, but probably does little harm. (February 5, 1884.) A flock this year stripped the currant bushes of their blossoms. (1885.)

Virginia.—*Variety Mills.* H. Martyn Micklem: It sometimes eats out young buds of vines and fruit trees. (December 21, 1886.)

West Virginia.—*Elizabeth.* Z. E. Thorn: It injures grapes and evergreen trees principally. (November 4, 1886.)

Wisconsin.—*Mishicott.* N. H. Terens: It injures cherry trees, currant bushes, and grape-vines. (November 17, 1886.)

CANADA. Ontario.—*Dunnville.* Dr. G. A. McCallum: I have frequently seen it eating the buds of fruit trees, especially the fruit buds. (August 20, 1886.)

Ottawa. W. L. Scott: I can positively affirm that I have seen them eat the buds of the elm, maple, and other shade trees in the early spring, though I do not think the damage was ever great enough to be especially noticeable. (January 26, 1886.)

Strathroy. L. H. Smith: I never saw any injury to my trees or vines by the Sparrow. In one instance a gardener of our town complained to me of the Sparrows budding one of his trees, a cherry, I think. (October 4, 1886.)

Toronto. Dr. William Brodie: The stomachs of almost all Sparrows taken in March, April, and May, contained buds of trees, and during these months the birds were repeatedly seen feeding on the buds of elms and maples throughout the city. [See Dr. Brodie's tables of the food of the Sparrow, page 311 of this Bulletin.]

New Brunswick.—*Saint John.* D. W. Pilkington: It eats the buds of the plum, gooseberry, etc. (Wickham, N. B., September 6, 1886.)

INJURY TO FRUITS, GARDEN SEEDS, AND VEGETABLES.

In response to the question, *Does the Sparrow injure garden fruits and vegetables?* seven hundred and eighty-eight replies have been received. Of this number 343 are brief, and for the most part unimportant, as they probably represent in most cases only the *opinions* of the writers, and afford no clue to the kind or amount of observation on which they are based. The following summary is a complete list of these three hundred and forty-three replies:

	Reports.
No	163
Think not; believe not	33
Not to my knowledge	15
Not so far as observed	22
Not here; not yet	3
Not much	6
Not materially; not seriously	6
Not to any great extent	6
Only to a limited extent	3
But very little; slightly	9
Not more than some other birds	5
No complaints heard	6
Yes	27
Think so; believe so	2
Am told so	1
To some extent	5
Injures fruits	6
Injures small fruits	3
Injures gardens	4
Destroys garden seeds	2
Does not injure fruits	4
Not observed to injure fruits	12

The remaining four hundred and forty-five reports, containing the most valuable information on this subject, can not be satisfactorily summarized, but they may be classified as follows:

	Reports.
Wholly favorable to the Sparrow	24
Wholly unfavorable to the Sparrow	384
Partly favorable and partly unfavorable	37

A few examples of this evidence have been inserted already in connection with the summary in Part I of this Bulletin, where the various injuries to fruits, vegetables, and seeds have been tabulated; and these, in connection with the following reports, will give a fair idea of the whole.

ALABAMA.—*Eufaula.* E. L. Brown: It eats vegetable seeds before they fully mature. It is impossible to save such seed. (September 17, 1886. Present about four years.)

Notasulga. Sam Duke: They fly down on the vines and eat the grapes; they also scratch up garden seed. (November 2, 1886. Present about three years.)

ARKANSAS.—*Clarendon.* Horace Ward: It injures grapes and strawberries. (September 20, 1886. Present "since June.")

Little Rock. Carl von Jagersfield: It injures fruits and vegetables to a considerable extent. (Washington, Ark., September 23, 1886.)

Lufra. W. P. Hale: My little vineyard came into bearing in 1886, and was very well fruited. It was afflicted with rot to some extent, but its worst enemy is the English Sparrow, which eats the grapes about as fast as they ripen. (Autumn, 1887.)

CALIFORNIA.—*Berkeley* (suburb). Dr. M. C. O'Toole: It eats every kind of fruit, and in great quantities considering the size of the bird. (February 17, 1887. Present about three years.)

Napa City. Postmaster: It is apt to eat buds and leaves on young and tender garden plants. (January 11, 1887. Present two or three years.)

Stockton. Postmaster: It injures peas, apples, cherries, peaches, apricots, plums, prunes, grapes, etc. (November, 1886. Present three years or more.)

CONNECTICUT.—*Ellington.* S. T. Kimball: It will eat the seeds of turnip, beet, and cabbage, if they are not well protected. Once in a while it has made a raid on our peas. (August 20, 1886. Present five or six years.)

Meriden. H. C. Hull: It injures grapes and devours berries. (August 31, 1886. Present sixteen years.)

New Haven. Frank S. Platt: I have twenty varieties of choice grapes which they peck and ruin. (September 9, 1886.)

New Haven. Dr. Fred. Sumner Smith: In New Haven the Sparrows used to spoil our grapes by the bushel, picking the ripest ones and sucking the juice. (West Hartford, Conn., November, 1885.)

Plantsville. E. R. Newell: It has been observed to feed on grapes and other fruits, but in this section not to any great extent. * * * Since writing the above I have seen a row of choice grapes of various kinds entirely ruined by the Sparrow, and find that they are committing depredations on all the vines in this neighborhood. (September 4, 1885.)

South Woodstock (country). Mrs. G. S. F. Stoddard: I have not observed it to feed upon grapes or other fruit. (January, 1886.)

Stratford. Robt. W. Curtiss: I have seen it eat sweet corn when in the milk. It tears open the husk when in that condition, and, besides what it eats, it lets the weather and dampness in upon the ear, which is apt to mold, though to no very great extent. (February 6 and October 11, 1886).

DISTRICT OF COLUMBIA.—*Washington.* William Saunders, superintendent of gardens and grounds, U. S. Department of Agriculture: Small fruits do not seem to be damaged much here in the city. As the boys prevent any of our grapes from ripening, I do not know how the Sparrows would affect that fruit. (April 13, 1887.)

Washington. Michael Durkin, gardener at the Navy Yard: It is very destructive to fruit. This season it took all the cherries from the trees on the grounds, so that not a single one remained. Early grapes, against the wall of the grounds, were attacked as soon as they began to ripen, and we obtained none fit for use. It also attacked the tops of peas as they came through the ground, as well as the tops of sprouting carrots and beets. (August 22, 1887. Present about fifteen years.)

Washington. Hawkins Taylor: The cat-bird and other birds eat my cherries and other fruits, greatly to my disgust, but I am sure the Sparrows have never touched a cherry, grape, or berry, and there are swarms of them about all the time, and no other birds; and if the Sparrows do not eat my grapes and fruits, why do they eat other people's grapes and fruits? (May 18, 1887.)

GEORGIA.—*Americus.* M. B. Council: It is very destructive to all garden seeds. (September 2, 1886. Present about two years.)

Atlanta. Judge John D. Cunningham, president Georgia Fruit Growers' Association: I have heard no complaint of the English Sparrow. (October 18, 1886.)

Cartersville. William Milner: We observe that they are very destructive to the grape crop and to all berry crops. (October 4, 1886. Present about three years.)

Fairburn. George Latham: It eats English peas, young turnips, and nearly all young vegetables. (October 16, 1886. Present three or four years.)

Lumpkin. A. W. Latimer: It injures garden fruits and vegetables to a limited extent; it destroys cabbage and turnip seed. (September 5, 1886. Present about five years.)

Macon. Prof. J. E. Willet: It injures garden fruits and vegetables to some extent. It has eaten early lettuce and the leaves of English peas in January, February, and March. It also eats the seeds of lettuce, and I think of the sunflower. (November 2, 1886. Present ten or twelve years.)

Milledgeville. Postmaster: There is some complaint by gardeners. When plants are seeding it destroys small seeds to a limited extent. (November 4, 1886. Present about six years.)

Savannah. J. N. Johnson: It injures fruits and vegetables but little; eating grapes and destroying flower seeds in gardens. On the garden farms in the suburbs it destroys to a limited extent various seeds, but it has not gone into the country generally as yet. (October 7, 1886. Present about eight years.)

ILLINOIS.—*Alton Junction* (country). John Koch: It likes peas, and cherries are not safe from it; but it is not plenty enough here yet to do much damage. (September 25, 1886. Present about four years.)

Bernadotte. Dr. W. S. Strode: Latterly instead of cereals I have found grape pulp in large quantities in the stomachs, and this crop has been fearfully damaged; fully one-half, or even more, of the grapes on the bunch being eaten, probably one-third of the crop being destroyed. The bird operates by inserting his bill and sucking out the contents, leaving the empty skins on the vine. (September 7, 1887.)

The fact that the English Sparrow seems determined to sample everything that the agriculturist can produce from the soil was illustrated here this fall by its picking holes into the sides of turnips, damaging many of them even while on every side there was an abundance of grain and weed seeds. (December 6, 1887. Present two or three years.)

Collinsville. Henry De Wald: It does not injure fruits or vegetables much; it eats a few berries and cherries. (October 5, 1886. Present about twelve years.)

East Wheatland. W. D. Patterson: It injures currants and raspberries, and eats a few strawberries. It also eats peas. (January 1888. Present about three years.)

Hillsborough. A. J. Edwards: It is a constant visitor to our gardens, but I have never seen it molest either fruits or vegetables. (October 6, 1886. Present about seven years.)

Louisville. Conrad E. Kaehler: It injures the cherry crop badly. It also scratches up garden seeds. (September 27, 1886. Present about six years.)

Monmouth. Dr. S. M. Hamilton: I have never seen the least bit of injury done to fruits or vegetables by the Sparrow. (September 24, 1886. Present twelve or fourteen years.)

Mount Vernon. John S. Bogan: I have two gardens, and I never noticed the Sparrow interfering with anything but cherries. (September 2, 1886. Present seven or eight years.)

Shawneetown. George Rearden: It does not eat the vegetables themselves, but destroys nearly all kinds of small seed, such as turnip, radish, lettuce, etc., and scratches up larger seeds. It also injures cherries. (October 2, 1886. Present about five years.)

INDIANA.—*Albion.* Charles M. Clapp: I know of numbers of cases where they have destroyed peas and many other vegetables. (October 14, 1886. Present five or six years.)

Charlestown. Dennis F. Willey: It injures peas and grapes, and any seeds that chickens would eat. (September 28, 1886. Present about four years.)

Dupont (country). T. S. Williams: They eat anything in the garden that is left to mature for seed. They eat or bite and break the skin on grapes, especially the sweet grapes, causing the bees to swarm after them. (October 6, 1886. Present about six years.)

Farmland (country). N. W. Wright: It eats garden seeds, and a flock of one hundred or more worked on a patch of sweet corn last fall and damaged the ears considerably. (March 7, 1887. Present two or three years.)

Hooker (country). Mary Benson: It injures cherries, but does no damage to vegetables. (October 11, 1886.)

Markland. Julia B. Brown. They work on currants, strawberries, and grapes to some extent. (October 11, 1886. Present about eight years.)

Newbern. U. F. Glick: It does not injure grapes or other fruit to any great extent here. (October 12, 1885. Present about two years.)

Vevay. William R. Stratford: It is fond of cherries and grapes, and will eat the fruit of nearly all our ornamental vines or shrubs. (October 7, 1886. Present about eleven years.)

IOWA.—*Burlington.* Howard Kingsbury: It is not nearly as injurious to fruits and vegetables as some of the migratory species, such as blackbirds, cow-birds, etc. (December 28, 1886. Present sixteen or seventeen years.)

Davenport. Davenport Academy of Natural Sciences, per W. H. Pratt, curator: It does not appear to do much injury here to fruits or vegetables. Some gardeners in the city report it as an expert at shelling peas, and it pecks at some small fruits a little. (April 20, 1887. Present about seventeen years.)

Dubuque. Edward T. Keim. Some damage to lettuce has been reported in wet seasons. (August 19, 1886. Present about ten years.)

Fairfield. Thos. C. Ross: This year, for the first time, it was seen five miles out in the country, on corn, in August. (November, 1887.)

Lost Nation. F. M. Frazier: It injured my grape crop this year, and it injures young plants, such as cabbage, in the spring. (October 16, 1886. Present five or six years.)

Sidney. G. V. Swearingen: They are destructive to grapes, raspberries, and other small fruits, and peck nearly everything that is grown in the garden. (October 8, 1886. Present four or five years.)

KANSAS.—*Blaine.* Postmaster: It picks young grapes and currants. (October 6, 1886. Present seven or eight years.)

Doniphan. Postmaster: It injures grapes very badly, also cherries and small fruits, such as raspberries, blackberries, etc. (October 12, 1886. Present five or six years.)

Eureka. A. W. Hart: It injures tomatoes and grapes. (September 4, 1886. Present two or three years.)

Garnett. M. A. Page: It injures leguminous fruit, and eats turnip seed and radish seed. (September 3, 1886. Present one year.)

Manhattan. Prof. D. E. Lantz: They have been known to injure grapes by puncturing the skin, but have not proved more destructive than some of our native birds. (Autumn, 1885. Present about six years.)

Kentucky.—*Adairville.* A. M. Moseley: There is great complaint of the Sparrow from the grape-growers. (Autumn, 1886.)

Bagdad. E. P. Denton: Grapes, cherries, and all small fruits are almost entirely destroyed by the Sparrow. (October 5, 1886. Present six or seven years.)

Bowling Green (country, 3 miles from city). W. Cook: It eats all fruits and seeds, including those of the sunflower. It also picks off pea-blossoms and young peas. (September 2, 1886. Present about three years.)

Casky. Frank B. Hancock: It injures grapes, berries, and all small fruits, and promises to be a *pest* in this way. (August 19, 1886. Present about six months.)

Ghent. George R. Bowie: It plucks off fruits and pulls up vegetables while tender. (October 8, 1886. Present six or eight years.)

Hartford. A. B. Baird: It destroys cabbage and radish seed as they commence maturing; but I have not known of its molesting fruits. (October 5, 1886. Present about six years.)

Hickman. L. O. Pindar: It picks off grapes and cherries, and drops half on the ground. It destroys ten times as much as it eats. It also injures strawberries, gooseberries, etc. (February, 1887. Present about ten years.)

Louisville. J. B. Nall: When other food was scarce I have seen it eat grapes, or rather ruin them by sticking its bill into them. (September 8, 1886. Present about twelve years.)

Stanford. Thomas Richards: It injures raspberries and strawberries to a small extent, and sunflowers when raised for seed. (October 29, 1886. Present about thirteen years.)

Louisiana.—*Schriever.* Postmaster: It eats the blossoms of English peas, and injures all vegetables bearing flowers. (October 8, 1886. Present one or two years.)

Maine.—*Brewer.* Manly Hardy: It injures grapes to the extent of its capacity to do so. It also eats garden seeds. (August 31, 1885. Present about four years.)

Maryland.—*Baltimore.* Otto Lugger: Germinating seeds are eaten, and the sunflower no longer ripens its seeds, as they are greedily eaten by the Sparrow. (May 10, 1887.)

Boonsborough. Robert Lamar: It is a nuisance here, plucking the blossoms of early vegetables. (November 12, 1886. Present about eleven years.)

Massachusetts.—*Amherst.* Hubert L Clark: In regard to the English Sparrow's attacks on fruit, my attention has been called to the fact that it is very injurious to early pears and apples. On a tree bearing about fifty pears (the variety known as "Beurre Gifford") more than thirty were destroyed by these birds. They would eat out a part of one side of the pear before it was ripe, and then leave the work to be finished by ants and other insects. I never saw the birds at their work but once, and then being at some distance I mistook them for young and dingy orioles, but am now convinced of my mistake. A friend living in the center of the town reports the same thing in regard to early apples, but he has seen the Sparrows at work. (September 8, 1887. Present fifteen years.)

Falmouth (country). F. J. C. Swift: They have been known to pick into and destroy pears. (Autumn, 1885.)

Medford. John Ayres: It was in my garden many years. I cultivated with my own hands and knew every tree and bush and all the fruit, and I never saw it touch either fruit or vegetables, as I have often seen the robin do. (May 29, 1884. Present twelve to fifteen years.)

Middleborough (country). E. A. Bowen: It destroys much corn, injuring spindle, silk, and ear. (September 21, 1886. Present ten or eleven years.)

Northampton. L. C. Ferry: It damages the grape crop greatly when the fruit is ripening. (September 10, 1886. Present about eleven years.)

Somerset. Elisha Slade: The Sparrow feeds on grapes, strawberries, cherries, raspberries, and blackberries. It is as bad on cherries as the robin, probably injuring as many as it eats. (August 20, 1886. Present about twelve years.)

Springfield. George A. Solly: Fruits, vegetables, and all kinds of seeds are devoured by the miserable Sparrow. It will have the first strawberries, cherries, and grapes; and in a few years we shall have to cover them with nets, as they do in England. (October 8, 1886. Present about twenty years.)

Taunton. H. G. White: It eats a great many grapes, and is partial to pears and strawberries, but is too fond of them to wantonly injure them. Cherries, however, it bites off and lets fall to the ground untouched. (February 25, 1886.)

MICHIGAN.—*Centreville* J. A. Russell: It destroys garden seed, and has been known to injure cabbage by perforating the heads with its bill. (October 8, 1886. Present about seven years.)

Eaton Rapids. S. R. Fuller: It has done great injury to my vineyard this season. It can be driven but a few yards at a time, and returns immediately. (October 11, 1886. Present four or five years.)

Hart. E. D. Richmond: It is very destructive to fruits, such as cherries, berries, and grapes. (September 4, 1886. Present about four years.)

Hastings. John Bessmer: It injures vegetables a little; attacking lettuce, beets, and the like, in early spring. (October 7, 1886. Present about ten years.)

Hopkins Station (country). Postmaster: They are not injurious in gardens, except to hemp and sunflower seed. (October 6, 1886. Present about three years.)

Jackson. Grove H. Wolcott: It is complained of as injuring small fruits, but I have never seen it doing the least injury to them. (August 15, 1884. Present ten years.)

Kalamazoo. Dr. Morris Gibbs: It eats berries and cherries. It also goes into the garden and tears up vines and digs into apples, and some vegetables. (November 23, 1886. Present nine or ten years.)

Lapeer. Fred. S. Odle: It injures several species of garden fruits; it is fond of ripe pears. (September 13, 1886. Present six or seven years.)

Mount Clemens (country). Jno. B. Leonardson: It eats raspberries and grapes (for the seeds) around the market gardens to considerable extent, and it nearly destroys the whole crop of salsify and turnip seed. (August 29, 1886. Present about three years).

Saginaw. F. S. Smith: It eats plums, cherries, pears, and almost any soft, sweet fruit. (October 6, 1886. Present four or five years.)

Saline (country). Norman A. Wood: It eats green peas as fast as they grow; also raspberries, blackberries, and strawberries, I think for the seeds. (September 6, 1886. Present about six years.)

Shelby. George W. Woodward: It gathers in great numbers and eats and destroys great quantities of cherries, grapes, and all small fruits. It will destroy the small fruits of a garden very quickly. (November 10, 1886. Present about six years.)

MISSISSIPPI.—*Aberdeen.* A. A. Wall: It is troublesome on cherries, strawberries, currants, raspberries, grapes, and vegetables. It makes havoc with everything going to seed in gardens. (Vernon, Ala., September 21, 1886.)

Holly Springs. John S. Finlay: It is very destructive to all kinds of fruit. November, 1886. Present about four years.)

NEW JERSEY.—*Caldwell.* Marcus S. Crane: Three of my neighbors say it injured their grapes this fall by picking holes in them. (November 30, 1886. Present about sixteen years.)

East Orange. H. B. Bailey: It injures cherries and strawberries to a great extent. (February 7, 1884. Present about seven years.)

Hackensack. Weldon F. Fosdick: Like the robin, it enjoys our cherries and strawberries, but does not cause us any loss, as we can not get at the small limbs which they reach. (August 26, 1886. Present about fifteen years.)

Hackensack. Henry Stewart: It eats strawberries, raspberries, currants, blackberries, and grapes. (February 5, 1884. Present about fourteen years.)

Ridgewood (country). Henry Hales: It destroys grapes with me to a great extent; it pecks holes in them and leaves them spoiled. (January 18, 1887. Present about fifteen years.)

NEW YORK.—*Binghamton* (suburbs). H. J. Gaylord: He will pick every pea from the pod if he once gets a taste of them. He destroys grapes when they get sweet and ripe, gashing but never eating them. He takes them all unless you fight him. (September 26, 1885. Present about fourteen years.)

Geneva (country). C. S. Plumb: It eats nearly all garden seeds, and is especially destructive to lettuce, cabbage, and salsify. (August 28, 1886.)

Highland Falls. Dr. Edgar A. Mearns: It destroys peas and other tender vegetables as soon as they appear above the ground, thus doing great damage. It destroys grapes in large quantities. (February 27, 1884. Present about thirteen years.)

Port Washington (country). Henry M. Burtis: It injures grapes and pears. (October 1, 1886.

Rochester. H. Roy Gilbert: It attacks garden fruits, and I have known it to destroy beds of tulips and other flowers. (August 20, 1884. Present about fifteen years.)

Rochester. Henry Harrison: It picks the small grapes as soon as the blossom falls, and picks holes in grapes when ripe, as well as in apples and pears. (August 23, 1886. Present about fourteen years.)

Schuyler's Lake (country). La Grande Southworth: It injures peas and corn, and I have seen it eating the fruit of the black cherry and choke cherry, but have never known it to injure any other fruit except the strawberry. (December 2, 1886. Present about six years.)

Sing Sing. Dr. A. K. Fisher: Young cabbage and cauliflower plants are attacked just after they are transplanted.

Syracuse (city and country). Edwin M. Hasbrouck: We have had our grape-vines almost cleaned, the Sparrow pecking the grapes for the seed until scarcely a bunch remained that was not ruined. It also eats cherries. (August 20, 1886. Present twenty-two or twenty-three years.)

Watertown. Herbert M. Hill: It injures grapes, berries, apples, and plums. (January 29, 1887.)

West Farms, New York. James Angus: It does some injury to garden fruits and vegetables, but not a tithe of that done by insects. (February 11, 1884. Present fifteen or twenty years.)

Westport. George C. Osborne: It eats all kinds of berries and pecks green corn. (November 5, 1886. Present about ten years.)

NORTH CAROLINA.—*Fayetteville* (suburbs). G. W. Lawrence: It pecks young peas and other early plants just after they come out of the ground. (September 4, 1886. Present three or four years.)

Morganton. George H. Moran: It is very fond of strawberries. (May 18, 1887.).

New Market (country). H. A. Beeson: It is abundant within ten miles, and pecks grapes, strawberries, tomatoes, plums, apples, peaches, and pears, causing them to decay. It also eats mustard, etc. (November 30, 1886. Present four years.)

OHIO.—*Bellaire.* W. K. Morrison: When the common gooseberry is only a few days old the Sparrow attacks it and cuts it in two, eating the front and leaving the other part on the bush. (October 28, 1886.)

Cincinnati (suburbs). Adolph Leue: I have seen it pick at ripe tomatoes. A few years ago I had two cherry trees laden with fruit all taken by this robber. In 1885 it was especially numerous in this locality, and completely devoured the ears of a whole patch of sugar-corn containing two square rods. (October 12, 1886. Present more than twelve years.)

Columbus, Ohio State University (suburbs). William B. Alwood: We have never observed the Sparrows injuring fruits of any kind, although we have taken some care to notice them. (July 16, 1887. Present more than ten years.)

Hamilton. George Harbron: It injures young peas, radishes, and lettuce. (September 13, 1886. Present about eighteen years.)

Napoleon. J. L. Haltes: It injures cherries and sweet apples. (September 2, 1886. Present eight or ten years.)

New Lisbon. J. F. Benner: I know that it injures grapes and mulberries. (August 27, 1886. Present about six years.)

North Bend (suburbs). R. H. Warder: It eats small fruits and is very troublesome among grapes; it also eats lettuce seed and peas. (November 27, 1886. Present about eleven years.)

Norwalk. S. Gray: It will eat almost any fruit, and also garden seeds. It is hard on ripe apples. (April 23, 1884. Present about five years.)

South Salem. W. N. Irwin: Among the forest-tree seeds that I noticed them working on were sassafras and spice-wood, and the only good I found them at was eating the rag-weed seed, so abundant in this State. (December 26, 1887.)

Wadsworth. Dr. J. F. Detweiler: They destroyed most of the pea and bean crop of a neighbor by pecking the young leaves as they appeared above the ground. (December 10, 1887. Present about thirteen years.)

Weymouth. Dr. Frank Young: It does not injure fruits or vegetables. It injures flax. (August 20, 1886. Present about six years.)

PENNSYLVANIA.—*Berwick.* Dr. A. B. McCrea: Lettuce, peas, and beets are its favorite food in the early spring, and often the entire bed is destroyed. It also destroys grapes to a considerable extent. (September 1, 1885.)

Collegeville. C. A. Rittenhouse: It injures grapes and strawberries to a large extent. (1885.)

Gap (country). John C. Linville: It scratches out and eats small garden seeds after they are planted. (November 16, 1886.)

Germantown (suburbs). Thomas Meehan: It injures strawberries and peas, and wild cedar trees are stripped of their berries as fast as they color. (August 21, 1886. Present twenty years or more.)

Hollidaysburgh (country). M. A. Young: They have been decidedly injurious here by pulling up early vegetables. (December 22, 1886. Present four or five years.)

Lancaster. Dr. S. S. Rathvon: Possibly it may injure garden fruits or vegetables, but I have not observed it, nor have I been able to positively ascertain that it does so. (October 8, 1886. Present sixteen years or more.)

Newport. E. L. Knight: It attacks divers vegetables, but does not injure them, or fruits, to any appreciable extent. (April 30, 1884. Present ten or twelve years.)

Philadelphia. J. Percy Moore: I have often seen the Sparrow feeding on cherries, (July 18, 1885), and several times on wild grapes (October 19), but never on cultivated ones, at least I have no records in my notes of such observations. (October 15, 1885.)

Philadelphia. F. R. Welsh: It feeds on no fruit but cherries, as far as I know, and the damage to these is very trifling. It seems to eat only the cherries that other birds or insects have made holes in. (October 6, 1885.)

Pottstown. John H. Steele: It eats the early salad plants and devours the peas. (May 15, 1884.) I have repeatedly seen it take grapes when ripening, and it also takes cherries. It eats early lettuce, peas, and other small green vegetables. (August 19, 1886. Present about sixteen years.)

RHODE ISLAND.—*Providence.* W. V. Osterhout: It is very fond of cherries and grapes, and when these fruits are ripe it really does a great deal of damage. (May 9, 1887. Present twenty years or more.)

TENNESSEE.—*Lawrenceburgh.* W. T. Nixon: It does not injure garden vegetables or small fruits. I have observed it feeding on the berries of the honeysuckle when snow covered the ground but at no other time. (February 21, 1887. Present about two years.)

Tiptonville. John D. Arnett: It has been very injurious to our fruit crops, especially grapes. (November 19, 1886. Present five years.)

TEXAS.—*Galveston.* Oswald Schindler: What little fruit is grown here is taken care of by the Sparrow, without permission of owner. (February 12, 1887. Present about nineteen years.)

UTAH.—*North Ogden.* Sidney Stevens: It does a deal of damage to fruit and crops. (November 22, 1886. Present about four years.)

Pleasant Grove. Mrs. P. Sterrett: it has become a great nuisance to gardeners. (November 11, 1886. Present about eight years.)

Provo City. Jas. G. Kenney: It is commonly reported destructive to fruit. (November 15, 1886. Present about six years.)

VIRGINIA.—*Lick Run.* J. T. Paxton: It eats all the small fruit, currants, raspberries, and strawberries. (March, 1887. Present six or seven years.)

Richmond. Hugh L. Davis: It mutilates strawberries, and destroys raspberries and cherries. (November 5, 1886. Present about four years.)

Variety Mills (country). H. Martyn Micklem: It eats gooseberries, currants, and peas (when first sown, when growing, and when in pod), and picks up small seeds generally. (December 21, 1886. Present about five years.)

WEST VIRGINIA.—*Halltown.* John H. Strider: It destroys early peas and cabbages, and later in the season garden seeds. It is very destructive to sunflower seed. (September 6, 1886. Present about seven years.)

WISCONSIN.—*Kewaunee* (country). Ramsom A. Moore: It injures small fruits, such as berries, grapes, cherries, currants, etc. (November 8, 1886. Present about two years.)

Lena. R. R. Byram: I have known it to injure garden vegetables, such as the tomato, etc. (August 20, 1886. Present several years.)

Milwaukee (suburb). Walter B. Hull: I have noticed but few examples of injury to fruit or vegetables, but there would be more if the Sparrows were not frightened on their first appearance. (August 23, 1886. Present about six years.)

Oshkosh. W. F. Webster: I saw them after sunflower seeds in my garden this year for the first time. I think they do not injure fruits or vegetables. (November 16, 1886. Present about seven years.)

CANADA. ONTARIO.—*Belleville.* James T. Bell: It does not injure garden fruits and vegetables to any great extent. (August 19, 1886.)

Oshawa. W. J. Stevenson: I have known them in a short time to clean out all the vegetables, etc., in a whole garden when first coming through the ground. (August 21, 1886. Present about ten years.)

Strathroy. L. H. Smith: There are several professional gardeners in our town, but I have heard no complaints of injury to fruits or vegetables. (October 4, 1886. Present about twelve years.)

Toronto. J. B. Williams, for committee of the Natural History Society of Toronto: It injures garden fruits and vegetables. People generally have been very favorable toward the Sparrow, but those who have gardens are beginning to complain of it. (August 27, 1884. Present about nine years.)

QUEBEC.—*Montreal.* George John Bowles: The market gardeners and farmers in the neighborhood complain greatly of the injury done by the Sparrow to garden fruits and vegetables. (August 8, 1884.)

NEW BRUNSWICK.—*Portland* (suburb of Saint John). J. W. Banks: It is very destructive to currants, raspberries, and pea blossoms. (October 10, 1886. Present two or three years.)

ENGLAND.—I know from personal observation that in England it is very partial to small fruits. (Douglas Robertson, Chloride, N. Mex., August 27, 1885.)

In England it is one of the greatest enemies to the fruit and grain crops, and premiums for its destruction are given in all the farming districts in the country. (Daniel Graves, Provo City, Utah, November 16, 1886.)

Cambridge County. In cherry orchards and gardens, when I was a boy, it was necessary to keep one or more boys with a shotgun from early daylight to dark. (Jabez Webster, Centralia, Ill., December 21, 1886.)

They operate on fruit, especially grapes, which they seem to wantonly destroy by boring a hole in every berry, which is then left to rot. (Thomas Birt, Utica, N. Y., September 16, 1887.)

GERMANY.—It eats cherries, and in the spring when the cabbage plants come up picks off the bud at the top, and by so doing uproots the tender plant or spoils it. (Mrs. W. Seliger, Hartford, Conn. March 13, 1884.)

INJURY TO GRAIN CROPS.

In answer to the question, *Does the Sparrow injure grain crops?* seven hundred and fifty replies were received. Three hundred and twelve of these were very brief and may be summarized as follows:

	Reports.		Reports.
No	96	Not more than any other bird	2
Think not; believe not	19	But slightly	5
Not to my knowledge	5	No complaint heard	9
Not so far as observed	16	Yes	31
Not here; not yet	13	Think so; believe so	2
No; confined entirely to cities	8	Is said to; have heard so	4
No; not abundant enough	15	Farmers complain that it does	3
Not much; confined mainly to cities	2	To some extent	9
Not much; not abundant enough	11	Injures all cereals	4
Not materially	3	Injures all small grains	8
Not seriously	10	It eats grain	26
Not to any extent	11		

The remaining four hundred and thirty-eight replies are more full and explicit, often giving illustrations of the damage done and the manner in which it is inflicted. These replies can not be summarized satisfactorily, and, for reasons explained elsewhere, only a portion of them can be printed. They may be classified roughly as follows:

	Reports.
Wholly favorable to the Sparrow	2
Wholly unfavorable to the Sparrow	431
Partly favorable and partly unfavorable	5

The following examples, representing less than one quarter of the evidence contained in these four hundred and thirty-eight replies, will give same idea of the character of the whole:

ALABAMA.—*Dadeville.* Postmaster: It stripped of seed in a short time some cat-tailed millet which had been left to ripen. (November 30, 1886. Present two or three years.)

CALIFORNIA.—*Berkeley.* C. H. Dwinelle: It seems to me that the so-called English or House Sparrow threatens to become in our mild climate (California) a nuisance of the first order. It has already made it almost impossible to conduct certain kinds of field experiments with grains, etc., with any kind of satisfactory results. (Brooklyn, N. Y., December 4, 1886.)

CONNECTICUT.—*East Hartford* (country). Willard E. Treat: I have often known it to do considerable damage to a rye crop, making a clean sweep wherever it alighted. (October 23, 1886. Present about three years.)

Stratford. Robert W. Curtiss: I have seen it eating wheat and oats in the field, when ripe, doing injury according to the number in the vicinity. (February 6, 1886.)

DISTRICT OF COLUMBIA.—*Washington.* Robert Ridgway: In the summer of 1886 I saw flocks of hundreds feeding on grain in stacks in Prince William County, Va., and I have also seen the same elsewhere. (February 8, 1887. Present sixteen or seventeen years.)

Washington. William Saunders: Seeds of many kinds are eaten greedily. It is very difficult to start grass anywhere about the grounds, as the seed is eaten as fast as sown. (April 13, 1887.)

GEORGIA.—*Americus.* M. B. Council. Country: It picks up the newly-sown seed, and is very destructive to the unharvested, ripened grain. (September 2, 1886. Present about two years.)

Hamilton. Charles L. Dendy: One of our citizens, Judge William I. Hudson, informs me that he was trying to mature the seeds of Millo maize from a small plat in his garden, but it was all destroyed by the Sparrow. (September 8, 1886. Present five or six years.)

Kingston. Postmaster: It attacks wheat and oats before they are ripe, and eats all the grain out of the heads. (October 11, 1886. Present about two years.)

La Grange. Thomas H. Whitaker: Like the rice bird, it injures tops of wheat, oats, rye, and barley. (September 3, 1886. Present about five years.)

ILLINOIS.—*Alton Junction.* John Koch: When the wheat stands in shocks I have seen at some places over twenty Sparrows on one shock. (September 25, 1886. Present about four years.)

Bernadotte. Dr. W. S. Strode: All the small-grain crops are more or less injured and the ears of new corn are torn open and the grain is bitten in two and eaten. (September 7, 1887.)

In my daily rides now I often notice small flocks of them out in the country, often 4 or 5 miles from any town, and on shooting one and examining the stomach I find it to contain for the most part wheat or rye, occasionally with bits of corn grains and weed seeds. (September 20, 1887. Present two or three years.)

Fernwood. George B. Holmes: I do not know that it injures grain crops, but I notice that the oat and wheat fields are always filled with flocks of them in the last of July and early part of August. (August 27, 1886. Present about five years.)

Griggsville. T. W. Parker: It has not been observed to feed on cereals until mature in the fall, when it feeds in flocks on corn and small grain. (September 7, 1885. Present two or three years.)

Louisville. Conrad E. Kaehler: Where the Sparrow is abundant, thousands of them take possession of the grain fields and greatly damage them. (September 27, 1886. Present about six years.)

Peoria. W. S. Cobleigh: I have heard farmers say that it attacks oats in the field and shock, and sometimes destroys a considerable amount. (August 24, 1886. Present five years.)

Quincy. T. Butterworth: It eats the wheat and oats in fields near the city, and threatens to be a greater curse than the grasshopper or locust. (August 19, 1886. Present about ten years.)

INDIANA.—*Angola.* Frank M. Powers: They alight on wheat in flocks, pecking the grain and breaking down the stalks. (November 5, 1886. Present about six years.)

Bedford. Noyes E. Strout: It injures all kinds of small grain; gathering in large numbers upon it when in the shock and stack. (September 13, 1886. Present seven or eight years.)

Brookville. Amos W. Butler: It feeds upon corn, wheat, rye, oats, millet, and grass seed, being most destructive to wheat when "shocked" in the field. (Autumn, 1885.)

Camden. F. C. Groninger: In harvest I have seen large flocks in the grain fields, on the shocks, and they destroyed a large quantity of the grain. (August 20, 1886. Present about 5 years.)

Farmland. N. W. Wright. Country: A flock of one hundred or more worked on a patch of sweet corn last fall and damaged the ears considerably; they also eat other corn in the same manner. (March 7, 1887. Present two or three years.)

Greencastle. W. H. Ragan: It injures wheat in shock and in field when left for late harvest, but under our system of husbandry this damage can never amount to anything serious. (September 28, 1886. Present about fourteen years.)

La Fayette. F. M. Webster: It injures wheat and oats in the field; and, I think, corn also; but possibly the injury to corn which I saw was due to blackbirds, which peck the ears in early fall. (August 25, 1886.)

Markland. Julia B. Brown: It begins on wheat as soon as the grain is formed in the head, and continues until it is housed or thrashed. (October 11, 1886. Present about eight years.)

New Albany. John B. Mitchell: In some wheat fields near the city the outside sheaves in the shock are denuded of grain. (October 6, 1886. Present about eleven years.)

Patriot. J. T. Bodkin: It works on wheat, rye, and oats, and on corn while young and tender. I have examined one or two dead ones and found their craws filled with wheat and rye. (May 24, 1887. Present about three years.)

Stony Point. Thomas H. Watlington: Last harvest I noticed small spots, sometimes three or four feet square, on which the grain was taken out of the wheat heads, and on investigation I found that the Sparrow did it. (September 20, 1886. Present about eleven years.)

IOWA.—*Grinnell.* John Houghton: It has been known to flock into wheat fields in great numbers. (October 6, 1886. Present about two years.)

Iowa City. C. C. Nutting: It is injurious to grain, eating habitually any of our common cereals growing near town. (October 13, 1886. Present about five years.)

Newton. W. E. Dingman: On July 21, 1886, I saw a flock of Sparrows alight in a wheat field, and found, on coming closer, that they were eating the grain. (October 15, 1886. Present two or three years.)

KANSAS.—*Manhattan.* Prof. D. E. Lantz: It feeds upon wheat and oats. The damage observed here has been inconsiderable, but this is due to the fact that the birds have not been with us long enough to become very numerous. (Autumn, 1885. Present about five years.)

KENTUCKY.—*Caskey.* Frank B. Hancock: It destroys a great deal of wheat, rye, and oats in shock. After wheat harvest I saw a flock of about 50 on and among the wheat and oat shocks, and they ate a great deal of grain. It is only a question of time in regard to their being *very* injurious to grain fields. (August 19, 1886. Present less than a year.)

Crescent Hill (suburbs of Louisville). Thomas S. Kennedy It visits wheat fields in large flocks and feeds on wheat and other grain in the shock, showing what it will do when it becomes more numerous. (October 5, 1886. Present five or six years.)

Lexington. Dr. Robert Peter: Professor Scovell states that it feloniously spoiled his experiments in wheat culture at the State Agricultural station by stealing the grain from the ear. (November 11, 1886. Present fifteen to eighteen years.)

Madisonville. J. F. Dempsey: It depredates on wheat fields in immense flocks. (September 3, 1886. Present about six years.)

Nicholasville. Postmaster: I have heard of oat and wheat crops being attacked by thousands of these birds and to some extent injured. (October 4, 1886. Present about eight years.)

Vanceburgh. J. Sparks: It congregates in grain fields and devours vast quantities of the grain. (October 20, 1886. Present about seven years.)

LOUISIANA.—*Barataria* (country). William B. Berthoud. It injures grain crops largely. Any small seed, such as oats, millet, etc., is eagerly sought after when sowed and lightly covered. (June 27, 1887. Present about four years.)

Schriever. Postmaster: It injures the rice crop. (October 8, 1886. Present one or two years.)

MAINE.—*North Livermore* (country.) George H. Berry. They eat oats and wheat in the field, working on it in the same manner as the bobolink. As far as observed rye and barley are not eaten. (August 23, 1886. Present about three years.)

MARYLAND.—*Baltimore.* Otto Lugger: Wheat and other ripening cereals are eaten, and the Sparrows injure more by their weight than by their appetite. (May 10, 1887.)

MASSACHUSETTS.—*Cambridge.* Dr. H. A. Hagen: I have not observed that it injures grain here, but I have no doubt it will do so in the fall, as it certainly does to a certain extent in Germany. (April 13, 1884. Present about eleven years.)

Holyoke. Thomas Chalmers: In the grain districts the Sparrow is very destructive to the grain crop; and in my opinion all the good qualities of the bird will not counterbalance the damage done in this way. (March 6, 1884. Present about fifteen years.)

Somerset. Elisha Shade: The Sparrow feeds upon all the cereals to as great an extent as any native bird. He devours Indian corn in the milk, and is as destructive in this respect as the crow or blackbird, because he stays in the field and will not easily be driven out. (October 19, 1885.)

MICHIGAN.—*Ann Arbor.* J. B. Steere: It has already moved out into the country to some extent, and lives on wheat when standing and nearly ripe, and also when in the shock. (1885.)

Bad Axe. J. T. Rorick: It gathers newly sown grain from fields, and shells grain from standing crops. (October 7, 1886. Present about three years.)

Centreville. J. A. Russell: When the grain fields are near the town it injures them by breaking down the stalk and picking out and destroying the grain. (October 8, 1886. Present about seven years.)

Hartford. Edward Finley: It feeds on grain stacks in the vicinity of the village in flocks of several hundred. (October 9, 1886. Present about seven years.)

Jackson. P. B. Loomis: I have seen it picking up the sown oats. (July 20, 1881. Present eight years.)

Kalamazoo. Dr. Morris Gibbs: It injures grain crops, more particularly oats, but also buckwheat, wheat, and any and all grains excepting corn in a dry state. It eats green corn. (November 23, 1886. Present nine or ten years.)

Lickley Corners (country). A. H. Carver: It is reported to have nearly destroyed some small fields of wheat 10 or 12 miles north of here. (August 24, 1886. Present one or two years.)

Marshall. Samuel S. Lacey: Farmers complain that when it gets a footing it injures wheat both before it is cut and in the shock, and even troubles their stacks. (November 20, 1886. Present about six years.)

Paw Paw (village and country). Postmaster: They alight on heads of wheat and oats and break them down; they also pick out the grains of wheat and oats in the sheaf. (November 4, 1886. Present twelve years.)

Petersburgh (country). Jerome Trombley: I have seen it feeding largely on standing crops of oats and wheat, as well as when in the shock and stack. (August 23, 1886. Present about nine years.)

Schoolcraft. P. D. Miller: Farmers tell me that it worked on their wheat and is now working on their corn. (October 11, 1886. Present about nine years.)

Tecumseh. C. A. Wright and C. A. Story: The injury is much greater to grain than to fruit or vegetables. It feeds first on grain, second on fruit, third on insects. When it is abundant it certainly destroys much grain. (October 11, 1886. Present seven years.)

Watrousville (country). E. B. Hayes: Large flocks settle down upon standing wheat when nearly or quite ripe, and not only feed upon it, but shell out the grain. (October 25, 1886. Present about four years.)

Ypsilanti (country, one and one-half miles from town). William Lambie: The Sparrows came out from the city when the wheat was first ripe, and fed on it and tangled down the straw. The most of them went away after harvest. (September 29, 1886. Present five or six years.)

MISSISSIPPI.—*Columbus.* D. C. Hodo: They are injurious to grain, eating all kinds. (September 21, 1886. Present about two years.)

MISSOURI.—*Oregon.* William Kaucher: In August it gathers in large flocks and invades the grain fields; but the numbers are not so great as to make these inroads very serious as yet. (September 21, 1886. Present about four years.)

NEW JERSEY.—*Blawenburgh.* David C. Voorhees: The Sparrow devours wheat, corn, and other grains; eating the wheat from the head in the field at the time of ripening, and afterwards in the shock and stack. It strips the husk off the corn at the small end of the ear and eats the grains when they are in the soft, milky state. It is eminently a granivorous bird, and will thrive with no insect food whatever. It appropriates food thrown out for the chickens, creeps through knot holes in stables, barns, and store-houses, and devours the grain in the racks and cribs to a very damaging extent. (December, 1885, and August, 1886. Present about three years.)

Caldwell (country). Marcus S. Crane: A flock gathers about our stacks of wheat, rye, and oats every season, and feeds on the grain. A pane of glass fell out of a window in the granary and the Sparrows soon learned to enter and steal wheat from the bin. Occasionally I have seen them forage in the field. (November 30, 1886. Present about sixteen years.)

Hackensack. Henry Stewart: It is very injurious to wheat and corn crops. I have seen a strip of wheat 10 feet wide laid down level all around the edge of the field. It injures field corn by tearing open the husks and eating the grain. (February 5, 1884. Present about fourteen years.)

Hackensack. Weldon F. Fosdick: I have seen the Sparrows for weeks in flocks of 300 or 400, eating rye and oats that had been stacked in barracks in the fall of the year. I have not known them to meddle with grain in the spring when first planted. (1885. Present about fourteen years.)

New Providence. H. F. Barrell: It feeds only on grain and seeds. I have repeatedly seen it in great numbers on fields of wheat and oats, eating the grain from the head. (1885. Present about twenty years.)

Passaic Bridge (suburbs). F. M. Carryl: It feeds in large flocks in fields of rye, oats, wheat, and buckwheat, and birds killed were stuffed full of these grains. (August 20, 1886. Present many years.)

NEW YORK.—*Baldwinsville.* Rev. W. M. Beauchamp: It feeds largely upon wheat, and perhaps on other grain, being driven in flocks just in advance of the reaper. (October 15, 1885. Present many years.)

Clyde. William M. McLachlan: I have seen great numbers on my grain stacks, stripping the grain off wherever exposed. (May 15, 1884.)

Constantia. Wallace D. Rhines: It is very injurious to wheat and oats. It does not eat as much as it wastes by breaking off the stems and shelling out the grain after being cut. (August 23, 1886. Present four or five years.)

Fredonia (country). C. E. Bartram: Flocks pull down the grain and destroy by shucking it out and scattering it over the ground. (August 25, 1886. Present about sixteen years.)

Ithaca (suburbs). Prof. I. P. Roberts: It injures wheat, rye, oats, and barley on the stalk, in shock, and in the barn. (August 24, 1886. Present about three years.)

Le Roy (country). Prof. F. M. Comstock: It eats grain in the field before it is cut, and after it is drawn into the barn. It lives in flocks about barns and in straw and hay stacks. (October 12, 1886.)

Long Island City. W. F. Hendrickson: I have seen flocks numbering hundreds in the grain fields in June when the grain was ripening, and believe they did a great deal of damage. (October 22, 1885.)

New York City. Hon. Robert B. Roosevelt: It is pretended that he devours enormous quantities of growing grain and threatens a famine in the land. His diminutive proportions are of themselves a tolerably conclusive reply to that accusation; moreover, he does nothing of the kind with us on Long Island, whatever may be his habits elsewhere. I have never seen a single one in the fields of grain. (August 8, 1886.)

Painted Post. A. H. Wood: It collects in large flocks in the fall, when it attacks fields of ripe wheat and oats, and is very destructive. (August 22, 1885. Present about nine years.)

Penn Yan. G. C. Snow: I have seen flocks of Sparrows alight on heads of wheat when ripe, or nearly so, eating the grain and breaking it down. (September 6, 1886.)

Rochester (suburbs). H. M. Jennings, gardener and seedsman: I have found it very destructive to grain crops. (February 12, 1887. Present about twelve years.)

Rochester. P. C. Reynolds: It is very destructive to wheat. (September 2, 1886. Present about twenty-one years.)

Sing Sing. Dr. A. K. Fisher: The Sparrows are very destructive to grain, both in the field and after it is placed in the stack. They prefer wheat, hence in this locality, where little wheat is grown, the loss is comparatively much greater than in localities where it is a staple crop. (1885. Present about nineteen years.)

Southampton. G. H. White: If grain is shocked up in the lot for a few days, the Sparrow will shell the tops of the shocks all out. It also shells it in the field somewhat. (August 23, 1886. Present ten or eleven years.)

Syracuse (city and country). Edwin M. Hasbrouck: I have seen large flocks, often numbering hundreds, in the oat, wheat, and buckwheat crops. (August 20, 1886. Present twenty-two or twenty-three years.)

West Brighton. C. M. Raymond: For two years we had a field of oats, and when ripe an immense flock of Sparrows would settle on it and feed all day long. (September, 1886.)

Westport. George C. Osborne: I have commonly seen flocks of hundreds settle in an oat or wheat field and begin their mischief by eating the grain. (November 5, 1886. Present about ten years.)

OHIO.—*Avondale.* Charles Dury: I endeavored to seed a patch of ground about 50 by 30 feet with a mixture of clover and other seed, but the Sparrows picked up every seed, and I was obliged to go over the place again and reseed it and cover the seeds with earth, and though I shot more than one hundred Sparrows from the spot they persisted in returning to the place as long as a seed remained in sight. (February 3, 1888.)

Canton (country). J. F. Niesz: Some of the fields of wheat are almost stripped for a distance of several rods from the fences. Oat-fields are likewise injured. (September 6, 1886. Present about three years.)

Cleveland. William F. Doertenbach: September 14, 1886, I saw a large flock of Sparrows in a wheat-field, and the owner said they did considerable damage. The only means he had taken to prevent their depredations was shooting them, but this did not lessen the number. (November 8, 1886. Present about thirteen years.)

Cleveland. S. R. Ingersoll: I have often seen large flocks of these pests settle down on newly-cut oats and wheat and eat large quantities of the grain. (September 1, 1886. Present about fourteen years.)

Cleveland. Dr. E. Sterling: About the 25th of July the early broods begin to gather in flocks of from fifty to four hundred. They go into the country for 5 miles around, eating every seed and grain that is ripe, and returning at night. They keep this up until November. (August 18, 1886. Present about seventeen years.)

College Hill (6 miles from Cincinnati). H. A. Koch: In the summer of 1884 I noticed a field of wheat along a roadside. A large flock of Sparrows had perched on the fence alongside, and the birds were continually flying in and out of the wheat, which was just about ripe. I found that for about 15 feet in from the road a large amount of grain was picked from the ears, but farther in the wheat became more full in the ear. (August 25, 1885.)

East Rockport. A. Hall: I have seen large numbers feeding upon shocks of oats, and farmers tell me they are very destructive to other grain. (August 26, 1886. Present about fifteen years.)

Laurel. Daniel Bohl: When the wheat is ripe one can see how much they eat and destroy. I have seen patches of grain which looked as though some one had taken the wheat heads and rubbed them between his hands—nothing left but straw and chaff. (August 6, 1887.)

Mount Vernon. B. L. Swetland: Mr. James Rodgers, who lives in the west part of this town, owns several acres of gardens and also grows a few acres of wheat each year. He told me that last year and this the Sparrows destroyed several bushels of his wheat (each year), and that in a few days they would have destroyed the entire crop. They worked on it as long as it remained in the field. (November 15, 1886. Present about ten years.)

South Salem. W. N. Irwin: The Sparrows began on the wheat as soon as it was in the milk, taking from one to a dozen or more grains from one side of the head. They worked on one side of the field along a wire fence and for a distance of about 50 feet into the field, and the entire length, about 80 rods. The ground was pretty well covered by the chaff they picked off. I also found them working on my buckwheat. (December 26, 1887.)

Wadsworth. Dr. J. F. Detweiler: One man in town had about three acres of wheat last year, and the Sparrows destroyed three-quarters of the crop. I have repeatedly seen great droves alight upon a grain-field and begin picking the grain from the heads. (December 10, 1887. Present about thirteen years.)

Wauseon. Thomas Mikesell: Last summer hundreds of Sparrows gathered on my wheat shocks, and in a few minutes had taken every grain from the outside of many shocks. Others tell me of their doing the same way at their places. (April 24, 1886.)

West Berlin. Charles H. Shaw: Some of the farmers in this section have had to cut their wheat earlier than they otherwise would, as the Sparrow was taking it badly. There is a flock at our wheat nearly all the time. (July 7, 1887. Present about four years.)

PENNSYLVANIA. *Berwick.* Dr. A. B. McCrea: I have seen wheat and oats materially injured when standing in the field. A farmer told me he had noticed the Sparrows going in and out of his mow, and upon examination found the top sheaves of the oats entirely husked. (September, 1885.)

Berwyn. Frank L. Burns: The Sparrow does considerable damage to ripening grain, principally wheat and oats. On the former it works in large flocks, shelling out much more than it eats. It is also very troublesome in the barn after the crops have been harvested, as it is impossible to keep it out. The extent of the damage is difficult to estimate, but it must be considerable, as it works on the grain about two weeks before harvest time, and also in the barn until it is thrashed. (1885.)

Chambersburgh (country). Davison Greenawalt: In the fall of 1884 we did not thrash our grain until November. We had a large mow in the barn filled with wheat. Large flocks of Sparrows came and soon had every head of wheat as far down as could be reached by them completely cleaned out. I have also noticed them in the grain-fields just before harvest. They will pick out the kernels of wheat as soon as they are sufficiently hard. (February, 1886.)

Lancaster. Dr. S. S. Rathvon: It does not seriously injure grain crops. Mr. J. Duffy, while cultivating a small farm in the vicinity of Lancaster, once reported to me that it appeared in flocks of from fifty to one hundred during midsummer and autumn, and fed on the grain in shock, but mainly on the gleanings. (October 8, 1886. Present sixteen years or more.)

Philadelphia. J. Percy Moore: On a number of occasions this year, in early August when the oats were being harvested, I noted immense flocks in the fields, picking large quantities of ripe grain from the hulls, and afterward taking what had fallen to the ground. I also noticed them in the corn. (September 7, 1886.)

On April 26, 1886, they were observed pulling and eating sprouting wheat. (March, 1887. Present twenty years or more.)

West Chester. Dr. B. H. Warren: They alight on fields of wheat and oats, and consume a great quantity of the grain, and by swaying to and fro and flapping their wings they shower the remainder on the ground. (January, 1887.)

South Carolina.—*Annandale.* Alexander Macbeth: I am informed that last week a flock of English Sparrows visited Captain Hazzard's barn-yard near Annandale, settled on a stack of rice, and commenced eating. They were with difficulty driven off. (Georgetown, S. C., February 4, 1887.)

Vermont.—*Charlotte.* F. H. Horsford: They ruined my field of oats, seeming to prefer it to wheat or barley, though both were raised near by. (February 21, 1884.)

Hydeville. A. I. Johnson: I have observed them in large numbers feeding on wheat and oats in the fields, and they will subsist there as long as the grain is left in the field. (August, 1886. Present about three years.)

West Pawlet. Dr. Frank H. Braymer: They alight in oat fields in large numbers, and injure the crop very much. (August 31, 1886. Present eleven or twelve years.)

Virginia.—*Accotink* (country). E. E. Mason: I have noticed its operations on standing grain and grain in the shock. (August 23, 1886. Present about twelve years.)

New Market. George M. Neese: They are very destructive to wheat in the garner, and to sorghum seed in the field. (December 30, 1885.) After wheat is cut and in shocks in the field the Sparrows go in flocks and eat the wheat from the shocks. I heard a farmer say they worked on his oats before it was cut. (August 27, 1886. Present about twelve years.)

Variety Mills (country). H. Martyn Micklem: Wheat fields just before harvest are sometimes much injured by the Sparrow, also wheat when first sown. (December 21, 1886. Present about five years.)

Wisconsin.—*Milwaukee.* Walter B. Hull: During the fall they move in large flocks and feed on grain, etc. When frightened they rise with a "whir," like immense flocks of blackbirds. (August 23, 1886. Present about six years.)

Racine. Dr. P. R. Hoy: It visits farms and does considerable damage to wheat, oats, barley, etc. The farmer would be greatly the gainer if the Sparrow were exterminated. (November 17, 1886. Present eleven or twelve years.)

CANADA. Ontario.—*Belleville.* Prof. James T. Bell: They have assembled in large flocks on the grain fields of Mr. J. W. Ponton and others in the vicinity of the city, and have destroyed the crops on several acres in the whole. (August 19, 1886.)

Dunnville. Dr. G. A. McCallum: Flocks of them may be seen for miles around this town frequenting wheat and other fields, but principally the grain fields; and many farmers kill large numbers during the winter in and about their barns, where they feed on the grain in sheaf. (August 20, 1885. Present nine or ten years.)

Listowell. William L. Kells. Large flocks have been seen to settle down on wheat, standing and in shock, and devour much of it. (August 23, 1886. Present about nine years.)

Oshawa. W. J. Stevenson: In the suburbs of the town they can be seen just before the grain is cut, and when it is in the stook in countless numbers completely destroying the crop. (August 21, 1886. Present about ten years.)

Plover Mills. R. Elliott: I have shot Sparrows in wheat fields (July 18, 1885) and found a large percentage of the food at that time to be wheat taken from standing grain. (September 6, 1886. Present about five years.)

Strathroy. L. H. Smith: What I fear about the English Sparrows is the injury they may yet do to the farmers by eating their wheat. When wheat is getting ripe they go out into the country in flocks and feed on it. They are spreading out in colonies amongst the farms, and should they do this to any great extent, I fear the damage they may do will be considerable; still, not more than in England, and I dare say they will not consume more than is willfully wasted in the fields by the farmers themselves. However, it is enough to raise a cry against them by agriculturists. Whether the bird does enough good to pay for the wheat he consumes when standing ripe in the field and in the shock is something I can not say. (October 11, 1883. Present about twelve years.)

QUEBEC.—*Montreal.* George John Bowles: Farmers in the neighborhood complain greatly of the injury it does to grain crops. (August 8, 1884.)

Quebec. Col. William Rhodes: It does not injure the grain crop about here. Our grain ripens so rapidly the birds have no time to injure it. (February 11, 1884. Present about twenty years.)

ENGLAND.—*Cambridge County.* This county is a grain and stock country; most of it is known as the Fen country. For many years previous to the time I left this country (1858) the farmers had taxed themselves three pence per acre to exterminate the Sparrows. They were so numerous that they were a terribly destructive pest to the grain farmers, in the winter time appearing in very large flocks of from five hundred to five thousand. When a lad of ten or twelve years of age, I was employed with a shotgun to keep them from pulling up and destroying the sprouting grain in October, but in the spring it was often necessary to have two boys in a 30-acre field of rye, oats, or barley to keep them from carrying off the newly-sown grain. So numerous and destructive were they that for a full week after the grain was up boys would be employed to keep them off. (Jabez Webster, Centralia, Ill., December 21, 1886.)

It does great damage to wheat crops. When a boy in Norfolk, England, I have seen fields where the wheat was destroyed two rods in from the fence by the Sparrow. The town paid so much per dozen for killing them. (Henry Harrison, Rochester, N. Y., August 23, 1886.)

I remember an old farmer in England who claimed that he raised 80 bushels of wheat to the acre. "That was a tremendous crop," said his hearers. "Yes," said he, "the way of it was this: All my men told me they were sure the Sparrows ate half of my wheat, and yet I thrashed 40 bushels to the acre." I saw the depredations myself on that particular crop, and they were very great. They generally attack the corners of fields and the parts along high hedges near a village or farm stack. (David H. Henman, Willows, Griggs County, Dak., December 12, 1886.)

For years previous to 1841, at which time I left England, we saw the grain crops around Leamington, Warwickshire, devoured by these little gluttons. My grandfather had to employ from thirty to forty girls and boys to drive the rascals from his fields of wheat, oats, and barley. My share in the work was simply to knock them down with the shotgun when the clouds were raised. The people in this country have no idea of the countless millions of Sparrows on the other side. (Thomas Birt, Utica, N. Y., September 16, 1887.)

I have seen wheat fields in England, adjoining timber and near towns, with belts six or eight feet wide totally divested of all grain. (Robert Williamson, Troy, Ill., October 2, 1886.)

RELATION TO OTHER BIRDS.

The original testimony on this subject consists of replies to several distinct questions, and is thus more difficult of analysis than the evidence in the preceding sections.

One thousand and forty-eight observers contributed information, and in one hundred and fifty-three cases their entire replies are of such a nature as to be readily summarized, while in three hundred and thirty-seven other cases only part of the evidence in each report can be treated thus. The following lists show the character of the evidence so far as it can be summarized briefly.

Among the responses to the question, *Does the Sparrow molest or drive off any of our native birds?* the following were received:

	Reports.		Reports.
No	18	Think so	7
Not abundant enough here yet	12	To a certain extent	2
Think not	13	Frequently	1
Not observed to	70	Constantly	1
Not to my knowledge	14	It seems to	3
No trouble observed	9	Am told so; have heard so	4
Not much trouble observed	4	Does not *drive* them away	3
Yes	49	Not observed to *drive* away any	6
Yes, some birds	35	Has *driven* none away yet	6

Among the replies to the question, *What species are molested or expelled?* were the following:

	Reports.		Reports.
All other birds	56	Nearly all small birds	21
Nearly all other birds	67	All except hawks	2
Nearly all species, I think	8	All except the kingbird	3
All song-birds	11	All except the bluebird	2
Nearly all song-birds	14	All weaker birds	2
All small song-birds	2	Small birds	6
All small birds	25	Many birds	2

Among the replies to the question, *What birds habitually resist the Sparrow, or attempt to drive it away unless themselves first attacked?* are the following:

	Reports.		Reports.
None	15	None except the blue jay	5
None successfully	4		

The remainder of the testimony relating to the Sparrow's influence on native birds, consisting of reports from more than eight hundred observers, is not only the larger but by far the most valuable part, and it is with the greatest reluctance that any of it is omitted. Some examples of this testimony have been cited in Part I of this Bulletin (pages 82 to 98), and the following additional reports will give some idea of the character of the whole.

ALABAMA.—*Cullman.* S. H. Herrin: The Sparrows usually take possession of the homes of the black martin and bluebird, and in many cases the latter have to give way to them. The bluebirds, and sometimes the black martins, try to retake their nesting sites, but fail. (September 24, 1886. Present about two years.)

Eufaula. E. L. Brown: None of our birds molest the Sparrow, but it attacks and drives away mockingbirds. (September 17, 1886. Present about four years.)

Jacksonville. G. B. Douthit: Mockingbirds are attacked, and are not nearly so numerous here as before the appearance of the Sparrow. (September 22, 1886. Present about three years.)

Moulton. J. M. Sandlin: I have known none except the bluebird to attempt to reclaim former nesting sites when these were occupied by the Sparrow. I have observed no trouble with any other native birds. (September 21, 1886. Present about one year.)

Tuskegee. Samuel Q. Hale: The bluebird resists the Sparrow, but is beaten every time. The Sparrow molests and drives off the mockingbird and all others. (September 17, 1886. Present about two years.)

ARKANSAS.—*Hot Springs.* Postmaster: The Sparrows fight everything, but martins are the principal sufferers. (September 17, 1886. Present about ten years.)

CALIFORNIA.—*Berkeley* (suburbs). Dr. M. C. O'Toole: The Sparrow, living almost exclusively around dwellings, comes in contact with few birds except the house swallow. In 1884 they took the nests of swallows under the eaves of my house, and the swallows left. I destroyed the nests, and although the Sparrows visit the place daily, they have built no nests since. (February 17, 1887. Present about three years.)

Berkeley. T. S. Palmer: I have known the English Sparrow to take possession of the nesting site occupied by house finches (*Carpodacus frontalis*) for several years, and, after adding to the old nest, use it for the reception of its own eggs. I have *not* observed that it drives out the house finches by force. Probably the Sparrow is not abundant enough as yet to do any considerable damage. (December 31, 1887.)

Haywards. Dr. J. G. Cooper: The cliff swallow and bluebird are the only species which appear to resist the Sparrow, but they are unable to hold possession. (August 25, 1886. Present six or seven years.)

Oakland. Walter E. Bryant: I have noticed that swallows (noticeably one pair of white-bellied, and several pairs of eave swallows) discontinued building on houses where the Sparrow nested, although before the advent of the Sparrow they had used them for several years. (August 28, 1886. Present five or six years.)

Oakland and San Francisco. E. F. Lorquin: It is driving away most of the indigenous birds in the cities. Some, like the cliff swallows, try to resist, but are generally unsuccessful, as the Sparrows combine and attack them in force. (August, 1887.)

San Francisco. F. Gruber: It molests, and to some extent drives away, native birds, such as blackbirds, house finches, snowbirds, warblers, and some species of sparrows. (March 5, 1884.)

San Francisco. A. H. Webb: Native birds have simply given place to the Sparrow. (September 13, 1886. Present about fifteen years.)

CONNECTICUT.—*East Hartford.* Willard E. Treat: It does not, to my knowledge, molest other birds in this locality. I once saw one fighting with the chipping sparrow, but the latter came off victorious. (November, 1885.)

Purple martins and robins resist the Sparrow, but generally with little success, as the Sparrow attacks them with superior numbers. I have known of its taking possession of martin boxes in early spring, before the martins arrived, but upon their coming the martins in two or three cases regained their nests by force. In addition to the birds already mentioned, bluebirds and barn swallows are attacked. (October 23, 1886. Present about nine years.)

Enfield. Newell A. Parsons: I have several martin-houses around my place, and in the spring the Sparrows and martins have great battles for possession of the houses. I frequently shoot several Sparrows, as I do not allow my martins to be molested by them. (1885.)

Gaylordsville (country). E. H. Austin: The bluebird is driven away, but the wren has always been successful. If Sparrows were numerous, however, I think the result might be doubtful. (August 19, 1886.)

Meriden. H. C. Hull: I have made boxes for both wren and bluebird, and the Sparrow took possession of both. (August 31, 1886. Present sixteen years.)

Middle Haddam (country). Henry L. Stewart: In the spring of 1885 the Sparrows had taken possession of the bluebird box in a pear tree, and there was fighting for three or four days, but the Sparrows conquered. Again, in 1886, the bluebirds were forced to leave another box. (September 2, 1886. Present eight years.)

Middletown. Walter B. Barrows: In May, 1886, a robin began a nest in a pear tree in my yard, only 30 or 40 feet from the house. The Sparrows at once attacked her, not in large numbers, but a few at a time and repeatedly, and although she persisted for several days, and nearly completed the nest, she was finally compelled to give up the fight and look elsewhere for a nesting site. In this case the Sparrows not only did their best to pull the nest to pieces during the bird's absence, but while she was sitting on the nest and shaping it, two or three of them would fly at and peck her until she was forced to take to her wings. (July, 1886. Present about sixteen years.)

Middletown. William P. Post: One morning last May I saw an English Sparrow engaged in pulling to pieces the partly finished nest of a robin built in a tree beside the walk. Supposing the Sparrow wanted the materials for its own nest, I stopped to see what turn affairs would take when the owner of the nest should appear. The Sparrow continued to tug at and pull out straws, strings, rags, mud, etc., dropping them to the ground as fast as loosened, until the robin, with a load of new material, perched on a neighboring tree before flying to the nest. The Sparrow at once left the nest, and taking up a position on a branch some distance above it, appeared to be completely absorbed in its own affairs, remaining quiet and unconcerned while the robin (who did not seem to see him) repaired her damaged nest, arranged the new material she had brought, and started in search of more. No sooner had she gone than the Sparrow returned to his work of demolition, and continued until again interrupted by the return of the owner, when the same performance was gone through without variation. I saw this exhibition repeated several times in the course of a few moments, and when I finally left the robin was still trying to complete her nest, and the Sparrow still doing his best to demolish it while she was away. I was satisfied that the Sparrow did not intend to use any of the materials of the nest, but was simply trying to prevent the building of a nest in that place. Later I found the Sparrow still busy in the same way, and the warfare was kept up for about a week, until the ground was covered with the wreckage. Finally the Sparrow gave up the attempt, and the robin, not seeming discouraged, raised her little family.

Again, the same month, while watching a chipping sparrow with its bill full of canker-worms, an English Sparrow appeared and attacked the chippy, which abandoned its load of worms and took to its wings. The English Sparrow examined the worms carefully from all sides, but seemed to conclude that they were not what he expected, for he refused to touch them, and the chippy afterwards returned and again took them in charge. (January 25, 1887. Present about sixteen years.)

Norwich. S. T. Holbrook: I have never seen an attack by our birds except in self-defense. The bluebird and house martin are driven from their houses, and the robin and wren are attacked, but the wren is a match for the Sparrow. (August 26, 1886. Present twenty years or more.)

Portland. John H. Sage: It drives off the bluebird, house wren, and purple finch, the latter for some years occupying a balsam-fir tree until expelled by the Sparrow. I have also seen it drive away the golden-crested kinglet, the redpoll, and the goldfinch. (August 16, 1886. Present about seventeen years.)

West Hartford. Dr. Fred. Sumner Smith. It has driven off (to a certain extent) bluebirds, purple martins, orioles, warblers, and flycatchers, expelling them from their nests time after time. (November, 1885.)

DISTRICT OF COLUMBIA.—*Washington.* Walter B. Barrows: Twice within the past month I have seen Sparrows acting as escorts for robins. On April 2, while crossing the Capitol grounds, a robin left a tree near which I passed and flew to another about 25 yards distant. He was followed at a distance of a couple of yards by five Sparrows which alighted all about him, and all within a very few feet, but did not attack him, and simply appeared to be waiting for him to move on. In the meantime two or three more Sparrows joined the original five, and when the robin flew to the next tree all of them followed closely and settled near him again. He seemed uneasy and yet disinclined to fly again, so I walked up within a few yards and watched for the next move. The Sparrows chattered a good deal, but did not hop about much, and the robin looked hopelessly about without uttering a sound or moving from the branch where he had alighted. Presently I took a step toward him, and he flew dejectedly toward another tree at a little distance, closely attended by his officious body-guard, which was augmented by several more Sparrows. This was too much for the robin, and, pausing but an instant on this tree, he started off swiftly across the grounds, as if determined not to stop again until he could stop alone. I watched him several hundred yards on his way, and saw one or two Sparrows turn back, but the majority still followed as he went out of sight.

Again, on April 26, I saw a robin in the Congressional Gardens followed persistently about in the same way by a single English Sparrow, apparently a female. While watching to see the outcome of this matter my attention was distracted for a moment by a yellow warbler, and on looking again both robin and Sparrow had disappeared and were not seen again.

Many times in this city, and at least twice in Boston, Mass., I have seen domesticated pigeons chased and attacked by single Sparrows, precisely as a kingbird attacks a crow; the Sparrow trying to strike the pigeon on the head, and following it in every case several blocks before giving up the chase. I did not in any of these cases see the origin of the trouble, and so do not know what was the cause of attack. (April 27, 1887.)

More recently I have seen a Sparrow attack and drive off a warbling vireo; and it is an every-day occurrence to see Sparrows persecuting robins, and snatching from them the worms and insects which they so carefully search out on the grass ground.

Only a few pairs of robins have nested on the Agricultural grounds this season, but whenever one appears upon the grass he is very soon confronted by from one to five Sparrows, which watch every motion and attempt to seize everything eatable which he finds. I have seen the robin lose in this way angle-worms and cut-worms, besides other species too small to identify positively. (June 15, 1887.)

Washington (Smithsonian Institution). Robert Ridgway. In some instances purple martins successfully resist the encroachments of the Sparrow, and song sparrows, being of very different habits, hold their own. Bluebirds and wrens resist until they find the task hopeless. The bluebird, house wren, Bewick's wren, and purple martin are affected far more than any other species, for the reason that their nesting sites are taken possession of by the Sparrows. (February 8, 1887. Present sixteen or seventeen years.)

Washington. William Saunders, superintendent of garden and grounds, U. S. Department of Agriculture: I do not think that native birds have been much affected in this city by the Sparrows. Birds seem to be as numerous about the Agricultural grounds now as formerly. I have, however, often seen Sparrows watching robins while hunting earth-worms, and have repeatedly seen them snatch a worm from the robin as soon as it had been dragged from the ground. (April 13, 1887.)

GEORGIA.—*Alpharetta.* William A. Porter: For years past the swallows have raised their young in the chimneys and niches of the court-house here, but now for two years the Sparrows have taken possession of these places. (September 8, 1886. Present about two years.)

Fairburn. George Latham: The Sparrow molests nearly all of our native birds, but they simply change their haunts, not going far unless again attacked. (October 16, 1886. Present three years or more.)

Kingston. Postmaster: It drives off all other birds; the mockingbird and bluebird fight it very hard, but the Sparrow whips them. (October 11, 1886. Present about two years.)

Macon. Prof. J. E. Willet: I have known it to oust the red-headed woodpecker from its nest; the catbird, however, raised two broods this year on my lot, where Sparrows are abundant. (November 2, 1886. Present ten to twelve years.)

Savannah. J. N. Johnson: It has driven off most of our native birds from the parks and trees within the city. The warblers are seldom seen now, and the absence of mockingbirds, redbirds, nonpareils, and especially house [chipping] sparrows, is notable. (October 7, 1886. Present about eight years.)

ILLINOIS.—*Aledo.* J. F. Henderson: The blue jay seems to be the only bird which can resist its encroachments. (September 29, 1886. Present one or two years.)

Alton. Hon. William McAdams, president State Natural History Society: That the Sparrow seems to be usurping the place of a number of our domestic birds, or rather those we have been used to having in the trees in our yards, seems to be a fact; yet there seldom seems to be actual combats between the Sparrows and other birds. I admit that I do not see why the robin, the blue jay, the thrush, the blackbird, oriole redbird, and others should go away, but the very common expression and feeling of our people here is that our native birds are now, within the last few years, much less numerous; and this fact is recognized with a feeling of sorrow by everybody. (August 30, 1886. Present about fourteen years.)

Carbondale. Prof. G. H. French: I have seen martins try to reclaim former nesting sites. The bluebirds are all known to have forsaken my premises on account of the Sparrow. (September 29, 1886. Present about six years.)

Carmi. Dr. Daniel Berry: Most of our house lots are large, containing fruit and shade trees, and the complaint is general that the Sparrow has driven away the robin, catbird, bluebird, and wren. (October 6, 1886. Present about ten years.)

Centralia. Jabez Webster: It drives away the yellow-bird we call wild canary, the wren, bluebird, swallow, bee-martin, mockingbird, and oriole. I think none of our native birds except the kingbird attempt to drive it off. The bluebird, robin, and thrush often have trouble with the Sparrow. I have seen the red-headed woodpecker, when four or five of them were together, put to flight a flock of thirty-five or more Sparrows. (December 21, 1886. Present about seven years.)

Chicago. H. K. Coale: It has driven away the bluebird, Baltimore oriole, white-bellied swallow, purple martin, chipping sparrow, kingbird (once common, now rare in the city), house wren, and red-eyed vireo. All these were once abundant, but have now taken up quarters in the country. (August 21, 1886. Present about twelve years.)

Collinsville (small city and country). Henry DeWald. I have seen different small birds, when driven away from their nesting sites, come back time and again, but the Sparrow always kept the place. (October 5, 1886. Present about twelve years.)

East Wheatland. W. D. Patterson: The Sparrow has occupied the nests of swallows, purple martins, and wrens, and usually holds possession. It has driven off nearly all our small insect-eating birds. (January, 1888. Present about three years.)

Fernwood. George B. Holmes: In a yard near my house is a martin-box which was taken possession of by the Sparrows during the winter, and when the martins returned there was quite a fight. The Sparrow conquered, but the box was removed by the owner and cleaned out. The bluebird and robin are driven away. (August 27, 1886. Present about five years.)

Hillsborough. A. J. Edwards: I have no evidence of any trouble between the Sparrow and other birds. (September 1, 1886. Present about seven years.)

Jacksonville. Prof. J. B. Turner: The bluebird and blue jay seem to hold their own best. Other birds seem to steadily and rapidly diminish, whether from their dislike to the Sparrow or from its monopoly of the bird food, or from some unknown cause, I can not tell. Apparently all the best singing birds retire before it. I have observed no special quarrels. I only observe the apparent, constant, and rapid, increase of the one and decrease of the other, to me unexpected and still unaccountable, from any specific and adequate known cause. (September, 1886.)

Johnsonville. Jas. J. Johnson: A pair of bluebirds had nearly finished a nest when the Sparrows came, two at first, then a dozen or more; but the bluebirds kept their position and reared a brood. (March, 1887. Present three or four years.)

Louisville. Conrad E. Kaehler: Martins will fight for their boxes when these are taken possession of by the Sparrow. (September 27, 1886. Present about six years.)

Monmouth. Dr. S. M. Hamilton: There is no more war between Sparrows and other birds than among birds of the same species, or between Sparrow and Sparrow. Martins, robins, bluebirds, wrens, and swallows try to reclaim former haunts, but no more than among themselves. The Sparrow is no match for the bluebird or robin, and the little wren holds its own with him. I do not believe the Sparrow drives away any of our native birds. I speak from careful observation, and they are just as plentiful here now as before the advent of the Sparrow. I have never seen the Sparrows band themselves together for attack, and am satisfied they do not do it; it is pair against pair. The assertion that they attack other birds in a body is sheer nonsense; no such thing is known in natural history of any species of bird. (September 24, 1886. Present twelve or fourteen years.)

Odin (suburbs). W. Ingram: The house wren sometimes has trouble with the Sparrow, but as a general rule they live in harmony. The Sparrow is not known to a certainty to have driven off any bird, but there is a noticeable decrease in the number of purple martins since the Sparrows have become numerous. (February 24, 1887. Present about six years.)

Olney. J. C. Allen: We know of no birds that successfully resist it. When it becomes numerous the bluebird, red-bird, robin, oriole, and chip bird all leave. (September, 1886. Present about twelve years.)

Pekin. Postmaster: One or two pairs of robins, catbirds, and brown thrashers still return and build nests in the court-house yard, but the mockingbird comes to our city no more to nest. Since the Sparrow was brought here our singing birds have decreased yearly. The Sparrows make their attacks in squads of three or more. (October 7, 1886. Present about sixteen years).

Rock Island. W. H. Hatch: It sometimes drives martins from their boxes and pigeons from their food; it also drives away the robin. I have seen no resistance on the part of any bird. (October 25, 1886.)

Shawneetown (country). George Rearden: It has taken the houses from the martin almost altogether. The martin resists, but with little success. The barn swallow and bluebird are also driven off. (October 2, 1886. Present about five years.)

Troy. Robert Williamson: I have watched the house swallow, in breeding season, drive Sparrows away from its nest. (October 2, 1886. Present about ten years.)

INDIANA.—*Albion.* Charles M. Clapp: A few years ago Mrs. A. S. Clapp had lots of martins, and every spring now they come back to these boxes, but the Sparrows drive them away. This spring not a martin could be seen near their old nests until I shot the Sparrows off the boxes for a few days, and then the martins came back. (October 14, 1886. Present five or six years.)

Bloomington. Prof. B. W. Evermann: I have seen Sparrows molest or drive off purple martins, house wrens, bluebirds, and a pair of great-crested flycatchers. (August 25, 1886. Present about eleven years.)

Burlington. W. A. Wright: The purple martin is the only bird that has come under my observation as trying to reclaim former nesting sites. In the spring of 1879 a pair of martins returning to their old home, a box in my yard, found it occupied by the Sparrows. They flew away, but soon returned with re-enforcements and took possession. I have noticed the Sparrow nesting in holes excavated by the hairy and downy woodpeckers, but whether the latter were driven away or not I can not tell. (September 21, 1886. Present sixteen years or more.)

Camden. F. C. Groninger: In my lot I constructed quite a number of houses for the bluebird and house wren. They occupied them and were driven away by the multitude of Sparrows, but have since reclaimed their abodes through my protection. I have noticed the wren fight the Sparrow when I was around, and have seen the Sparrow fly from it. The Sparrow molests the purple martin, bluebird, wren, robin, chipping-sparrow, and red-winged blackbird, but none are entirely expelled from their former haunts. (August 20, 1886. Present about five years.)

Crandall. G. W. Jenkins: The martin and Sparrow quarrel for nesting places, but the one which first builds in the house continues to hold possession. (October 12, 1886. Present one or two years.)

Delphi (country). John Barnard: It has been known to drive away all kinds of birds—martins, robins, grosbeaks, warblers, etc. The martin resists, but with no success, for if one begins to fight he always has five or six Sparrows on him, and there are one hundred Sparrows to one martin. (October 12, 1886. Present many years.)

Ferdinand. A. J. Fisher: The robin, summer martin, and bluebird are most troubled by the Sparrow. The latter is always the aggressor and nearly always the victor. They have furious conflicts. (October 8, 1886. Present about eight years.)

Fort Branch. C. F. Garrison : In one case here the martins had a nest in a box on a pole and the Sparrows drove them from the box after a fierce fight. The bluebird is also attacked and driven away. (October 7, 1886. Present three or four years.)

Greencastle. W. H. Ragan: The crow-blackbird, robin, jay, bluebird, and wren will drive it away from the vicinity of nesting places. I think the stories of the pugnacious character of the Sparrow are greatly exaggerated. The pugnacious boy has probably had more to do with banishing native birds than the Sparrow. As a rule the Sparrow occupies a field (streets and populated regions) that other birds are not adapted to, and it holds this territory the year round. (September 28, 1886. Present about fourteen years.)

Irvington. Sylvester Johnson : It does not attempt to usurp the rights of other birds. There are as many birds here now as before the Sparrow came, and all live in peace and harmony. (September 20, 1886. Present about six years.)

La Fayette. F. M. Webster: The blue jay is the only bird that will nest in my yard where these birds are abundant. (August 25, 1886. Present about twelve years.)

New Albany. Jas. M. Payton: The Sparrows are good fighters, and attack every bird that attempts to nest in boxes where they build. They do not migrate, but remain all winter, and when the bluebird and martin return in the spring they find the Sparrows in possesion of their houses and hard to dislodge. The martin is most generally successful, but the bluebird usually gives it up. A few years ago when the martins came in the spring and found the Sparrows in their boxes there was hard fighting for several days; then they stopped, and the martins occupied the upper tier of boxes and the Sparrows the lower, and there was no more fighting that year. (September, 1885, and September 6, 1886. Present since 1867.)

Richmond (suburbs). Joseph C. Ratliff: I have seen the conflict between the bluebird and Sparrow, and know of martins that staid about their box for several days after the Sparrows had possession. I think it either drives other birds away, or that other birds will not stay in its company. Among the birds thus affected may be mentioned the robin, field or song sparrow, and woodpecker. (November 5, 1886. Present about seventeen years.)

Stony Point (city and country). Thomas H. Watlington : The bluebird and house-martin attempt to reclaim their nesting sites. I have seen some fighting, but as yet the martins appear to hold their boxes against all opposition. I have not noticed that any other birds are molested as yet. (September 20, 1886. Present about eleven years.)

IOWA.—*Bellevue.* Dr. Lawrence Millar : I saw a pair of chickadees drive a pair of Sparrows from their nesting place in an old apple tree in my garden. Warblers, the chipping sparrow, the bluebird, and yellow finch are molested or driven away by the Sparrow. (October 24, 1886. Present about ten years.)

Davenport. Davenport Academy of Natural Sciences, per W. H. Pratt, curator: As far as can be determined in this locality, it has had very little influence in driving off our native birds; it perhaps interferes somewhat with the bluebird. (April 20, 1887. Present about seventeen years.)

Grinnell. John Houghton: The wren, bluebird, martin, blue jay, and robin resist the Sparrow with varied success. I have seen battles for nesting places between the Sparrow and the wren, bluebird, and martin. In addition to the above, the goldfinch, oriole, and golden-crowned kinglet are molested, but I do not think the Sparrow is abundant enough here to expel any native birds yet. (October 6, 1886. Present about two years.)

Sidney. G. V. Swearingen: The best and most useful of our smaller birds in this country are whipped, and some of them have nearly disappeared. On my own farm I have seen the pewee, robin, thrush, native sparrows, and others trying to whip the rascals out, but without help from man they all fail. (October 8, 1886. Present four or five years.)

West Liberty. Dr. E. H. King: The Baltimore oriole successfully attacks it wherever met. The Sparrow has nearly driven the bluebird, wren, and even the blue jay from our village, and, with the exception of the oriole, robin, and catbird, it molests all birds which are semi-domestic in their habits. (October 14, 1886. Present about nine years.)

KANSAS.—*Burlingame.* J. Mayberry: Other birds are less numerous since the appearance of the Sparrow; the wren and bluebird have very sensibly diminished in numbers, and the mockingbird, oriole, and robin are molested or driven away. (October 6, 1886. Present about fifteen years.)

Chanute. S. H. Scott: It fights the cliff swallow, and I have seen it take possession of a swallow's nest about the time it was completed. (October 5, 1886. Present less than a year.)

Fontana. M. J. Campbell: It molests or drives away the swallow, martin, wren, and robin. The kingbird resists it, but without success. (October 9, 1886. Present less than a year.)

Manhattan. Dr. Charles P. Blachly: A few English Sparrows came here two or three years ago, at which time there were robins, Baltimore orioles, and orchard orioles in considerable numbers. The Sparrows have increased in town, while the others named have decreased, although the opportunities for the increase of the natives are much better. I have seen the Sparrows drive away robins and martins. (November, 1885. Present two or three years.)

Manhattan. Prof. D. E. Lantz: The Sparrow has frequent fights with the robin and some other familiar birds, but is not always victorious, and no birds have been driven away. (September 27, 1886. Present about six years.)

Morantown. P. J. McGlashan: It has not been known to drive away any of our native birds. This year a small martin box with four holes was reclaimed by the martins, except one hole, which was retained and occupied by the Sparrows. (October 15, 1886. Present about eighteen months.)

Quenemo. Dr. A. R. Bodley: I do not think any bird fears the Sparrow more than other birds. It does no more fighting than the jay, kingbird, or crow-blackbird. I have not known it to molest any of our native birds, and I have the jay, crow-blackbird, migrating thrush, bluebird, and cardinal grosbeak all about my house in spring and summer. (October 13, 1886. Present four years.)

Topeka. F. W. Giles: My opportunities for observing the Sparrow's habits have been most excellent, and I dispute any man who says he knows better of the habits of the bird in Kansas than I do. In the twelve years during which I have been a constant observer of their mingling with native birds I have never seen a case of antagonism. The ridiculous complaint of their being quarrelsome toward native birds has prevailed here as at the East. I have many times offered $10 reward for proof of a Sparrow having attacked any other bird, except it were a blue jay or other predatory bird destroying their eggs or young. True we have now very few native birds, less than we had twelve years ago, but in what city of thirty thousand inhabitants are native birds abundant? (October 6, 1886. Present twelve years.)

KENTUCKY.—*Bowling Green* (country, three miles from city). W. Cook: It molests and drives away all other birds, except, perhaps, the bluebird, which sometimes successfully resists it. (September 2, 1886.)

Burkesville. W. F. Alexander: It molests the redbird, mockingbird, common sparrow, and snowbird. The bluebird attempts to reclaim its former nesting site. (October 27, 1886. Present five or six years.)

Crescent Hill (suburb of Louisville). Thomas S. Kennedy: The Sparrows came from the city in large flocks and located themselves in outhouses, barns, and about the dwelling. They have driven away the American sparrows and finches, the titmouse, wren, catbird, robin, and other birds. (October 5, 1886. Present five or six years.)

Ghent. George R. Bowie: It drives away the bluebird and black martin. It takes possession of their nesting places during winter and does not allow them to come back. (October 8, 1886. Present six or eight years.)

Hartford. A. B. Baird: I have witnessed contests between the English Sparrow and our native birds, in which the Sparrows confederated and soon became the victors. In attempting to reclaim former nesting places the bluebird appears to hold its own, but the catbird, which has frequent contests with the Sparrow, is obliged to remove. (October 5, 1886. Present about six years.)

Lancaster. W. H. Wherritt: I do not *know* the cause, but several of our small birds, among them the wren, common sparrow, and snowbird, have almost disappeared since the Sparrow came. I think no bird except the martin ever comes in conflict with the Sparrow. (October 11, 1886. Present eight or nine years.)

Louisville. J. B. Nall: Before the introduction of the Sparrow the bluebird and pewee were common on every farm; now it is a rare thing to see one. The martin is also molested. (September 8, 1886. Present about twelve years.)

LOUISIANA.—*Barataria* (country). William B. Berthoud: The mockingbird resists the encroachments of the Sparrow, and on rare occasions the tyrant flycatcher, or kingbird, attacks it with partial success. Warblers and flycatchers are the birds most commonly molested and driven away, but also the wren. (June 27, 1887. Present about four years.)

MAINE.—*Fairfield.* James O. Whittemore: I have known but one instance in which any of our native birds attempted to drive off the Sparrow when not first attacked. A pair of woodpeckers (yellow-shafted flicker) took possession of a hole formerly occupied by these birds and successfully held it against a great number. I have known bluebirds and tree swallows to be driven from holes by the Sparrows, and unable to make resistance. I remember an instance of a Baltimore oriole dispersing a large number of Sparrows, but the case of the flickers was the most positive one I have known. I have never observed any actual molestation except the above, and do not think the Sparrows are plenty enough in this locality to diminish the number of other birds. (August 19, 1886. Present ten years.)

Farmington. E. E. Richards: It has a habit of attacking nearly all birds coming in its way, especially about nesting places or feeding ground. I think it is always the aggressor, except perhaps in contests for martin houses and nesting places. (August 20, 1886. Present about six years.)

North Livermore. George H. Berry: It molests and drives away the robin, bluebird, chipping sparrow, red-eyed vireo, and the smaller birds in general. The purple martin and white-bellied swallow attempt to reclaim former nesting sites. (August 23, 1886. Present about three years.)

Portland. Nathan Clifford Brown: I have seen it attack the downy woodpecker, and molest the robin and Baltimore oriole. It drives away the white-bellied swallow by taking possession of its nests. (1884. Present ten years or more.)

MASSACHUSETTS.—*Amherst.* Hubert L. Clark: I have noticed that the Baltimore oriole (*Icterus galbula*) is almost the only bird which does not seem to be troubled by the Sparrow. It is the only bird which is to be found breeding in our streets as abundantly as five or six years ago. This may be an exception, but I thought it worthy of note. (September 8, 1887. Present about fifteen years.)

Cambridge. William Brewster: Markedly and unmistakably and with appalling rapidity our native birds are leaving. I do not often see the Sparrows actually attack them, however. All species, with the exception of robins, blue-jays, and crow-blackbirds, are affected, but house wrens, bluebirds, swallows, least pewees, and orioles most noticeably. (January 30, 1884. Present eleven years or more.)

Holyoke. W. F. Lamb: It certainly molests and drives away such birds as the purple martin, robin, cherry bird, chipping sparrow, white-bellied swallow, goldfinch, and song sparrow. (February 29, 1884. Present fifteen years or more.)

Holyoke. F. H. Metcalf: Bluebirds, wrens, and martins generally attempt to drive it away from some nesting places, but the Sparrows are too numerous. I have seen one wren at the door of a bird-house successfully resist the attack of nine Sparrows. She then tore the Sparrow's nest to pieces. Bluebirds generally give in to the Sparrow. It molests the robin, bluebird, wren, orioles, vireos, song, field, Savanna, and other sparrows, grass finch, and martin. The latter is becoming extinct, I believe, from this cause. (August 23, 1886.)

Medford. John Ayers: I never saw it assail birds of other varieties, but have often seen them fight among themselves. I have heard many persons repeat the current stories of their driving off native birds, but have never seen a person who could name any kind that suffered from them. Certainly the robins are as abundant as ever, and peck and destroy my peaches, pears, and grapes as usual. (May 29, 1884. Present twelve or fifteen years.)

Rehoboth (country). F. H. Carpenter: A small colony of martins has driven away three pairs of Sparrows from their box each spring since 1882. The Sparrow has driven off the white-bellied swallow. (August 21, 1886. Present about seven years.)

Somerset. Elisha Slade: The chipping sparrow, goldfinch, purple finch, bluebird, white-bellied swallow, and summer yellowbird have retired before the pugnacious, quarrelsome exotic, and in some cases have almost entirely disappeared from around the house, barn, and orchard. (October 19, 1885.)

I do not know of any non-predatory bird which habitually attacks the Sparrow unless itself first attacked, and even when attacked the defense is usually unsuccessful. I know of one successful instance, however. A pair of white-bellied swallows having possession of a box, their nest built and eggs laid, were attacked by a pair of English Sparrows, and the swallows bravely resisted the attack and compelled the Sparrows to retreat. In less than half an hour the Sparrows returned, accompanied with six other Sparrows to aid them, and commenced an assault. The swallows fought hard in defense of their home and won the battle of the brave, though only *two* to *eight*. (August 20, 1886. Present about twelve years.)

Taunton. H. G. White: It takes possession of all available places in the city, and as it commences to breed as early as March (March 12, 1884), it has full control of the boxes put up for the accommodation of bluebirds and white-bellied swallows before these reach their summer homes. Consequently these birds leave their old haunts to find new breeding places, and few birds except Sparrows are seen in the city. * * * For a number of years it has been my habit to place an elevated platform in the garden, on which the birds might feed when snow covered the ground. Formerly juncos and tree sparrows were there all day in flocks of twenty or twenty-five, but for the last three winters their numbers have grown "beautifully less," and this year they have only been in the garden twice, while Sparrows are as abundant as juncos used to be. (February 25, 1886.)

Tyngsboro (country). C. W. Swallow: I found a nest of the English Sparrow in a dead apple-tree limb May 16, 1884. Under the nest was a dead white-bellied swallow, which had evidently been killed by the Sparrow. The Sparrows are quarrelsome, especially with bluebirds and white-bellied swallows. (March 29, 1887.)

MICHIGAN.—*Allegan.* Rev. D. D. Chapin: The smaller birds generally, which are wont to nest about houses and yards, are molested or driven away. The goldfinch suffers in particular. (October 30, 1886.)

Corunna. Dr. C. T. Armstrong: It drives away or kills all song-birds and other desirable birds—robins, orioles, tanagers, song sparrows, bluebirds, phœbes, and even the pugilistic martins. (November 1, 1886. Present about five years.)

Elk Rapids. Jas. E. Rankin: It has frequent battles with the robin and chippy-bird, and the bluebird seems to be driven back, but the house martin retains its own nesting place. (October 18, 1886. Present about six years.)

Frankfort. Charles Burmeister: It molests and drives away the bluebird, chickadee, and wren. It has been observed that four or five Sparrows would attack one little bluebird, and by force of numbers put the solitary bird to flight. (October 12, 1886. Present about five years.)

Hillsdale. Ira B. Card: The martins return in large numbers once or twice a year and try to reclaim former nesting sites, but fail ingloriously in every battle. The Sparrow drives off the robin, bluebird, graybird, blue jay, and all other native birds. There is nothing left but the filthy Sparrow and his dirt. (October 6, 1886. Present twelve years.)

Hudson. A. H. Boies: I have observed severe battles between English Sparrows and bluebirds, martins, and some of our smaller birds. (1885.)

Kalamazoo. Dr. Morris Gibbs: Many species are bothered by the Sparrow, and all make more or less resistance, but generally with little success. The bluebird, robin, and martin attempt to reclaim former nesting sites; the bluebird gives the best fight, and the robin does fairly well, but the Sparrow drives all out. (November 23, 1886. Present nine or ten years.)

Mears (country.) George Wyckoff: It drives off the eave swallow and bluebird. The latter will fight the Sparrow, but as the odds are always against it, sometimes five to one, it has to give up. (October 7, 1886. Present about three years.)

Mount Clemens (country). Jno. B. Leonardson: My bird-houses contained about seventy pairs of martins; now all are gone. Bluebirds once lived on my cornice brackets with the phœbe, but they have been driven away, as have also the barn swallow and ground-bird. (August 29, 1886. Present three years.)

Owosso. A. Lee Williams: It is confined to the city, and as yet does not clash much with our native birds, except with swallows and martins, which I think it will in time drive off. (September 2, 1886. Present about ten years.)

Petersburg (country). Jerome Trombley: The house wren attacks the Sparrow and usually comes off victorious. (August 23, 1886. Present about nine years.)

Saline (country). Norman A. Wood: I know several instances in which house wrens and martins have successfully reclaimed their nesting sites. Last spring a Sparrow had a nest commenced in a bird-house occupied the year before by a bluebird. The bluebird pitched the nest out, and finally occupied the box. The Sparrow molests and drives off the Baltimore oriole, robin, chipping sparrow, purple grackle, and yellowbird. (September 6, 1886. Present about six years.)

Saranac. M. S. Lord: I have noticed that flycatchers and the tree sparrow are molested and driven away. (October 8, 1886. Present seven years.)

Sault de Ste. Marie. William S. Shaw: I have seen swallows fight with them until they fell to the ground. In one case the swallows drove them off their nest. (October 11, 1886. Present three years.)

Schoolcraft. P. D. Miller: It drives off the robin, bluebird, swallow, martin, and chippy. I have watched their actions with the robin and chippy in my yards. Three or four years ago I had a good many nests of the chippy in my yard, but this year I do not think they were able to nest there at all. The English Sparrows destroy their eggs. (October 11, 1886. Present about nine years.)

Tecumseh. C. A. Wright and C. A. Story: Robins and crow blackbirds seem to be the only ones that can hold their own against the Sparrow. (October 11, 1886. Present seven years.)

Thornville. Dr. John S. Caulkins: A pair of Sparrows last summer drove out a pair of barn swallows from their nest (occupied by them for two or three previous seasons) and took it for their own. The swallows attempted to reclaim their nest, but failed. The Sparrows returned to the nest again this summer, and raised their young there. They begin to build and lay sooner than any of our native birds. (August 14, 1886. Present four years.)

MISSISSIPPI.—*Columbus.* D. C. Hodo: The bee martin and house martin resist the encroachments of the Sparrow, and attempt to drive it off, but the Sparrow holds the field. The house martins attempt to build in their old nests, but are driven off, as are also the mockingbirds and bluebirds. (Carrollton, Ala., September 21, 1886. Present about two years.)

Corinth. Dr. Rawlings Young: It is not yet numerous enough to scatter into the suburbs and molest other birds. I have seen blue jays and mockingbirds fighting it. (September 7, 1886. Present about two years.)

MISSOURI.—*Cape Girardeau.* Henry A. Astholz: It has driven away the mockingbird, bluebird, and house martin. (September 3, 1886. Present about six years.)

NEW HAMPSHIRE.—*Franklin Falls.* George Stolworthy: It occupies nearly all the artificial nesting places formerly used by the white-bellied swallow, martin, and bluebird, and has driven away the robin and Baltimore oriole, which used to build near these places. The only species I have seen nesting near the Sparrow are the cherry bird and the pewee. This spring three pairs of Sparrows occupied nesting places that had been used by bluebirds for three years. The bluebirds tried hard to recover them, but without success. Purple martins and swallows had no better success. (August 24, 1886. Present six or seven years.)

Lisbon. Dr. C. H. Boynton: They have not been here long enough, and are too few in number to cause a decrease in the number of native birds. (February 4, 1884. Present about three years.)

Milford. Jas. P. Melzer: The purple martin is successful in reclaiming former nesting places; the bluebird and white-bellied swallow attempt to reclaim nesting sites, but are not always successful. I think the bluebird would usually succeed if it were not easier to find another nesting place than to have a long fight. (August 28, 1886. Present about ten years.)

NEW JERSEY.—*Bridgeton.* Charles E. Bellows: It molests the chipping sparrow, house wren, and summer yellowbird. The purple martin habitually resists the encroachments of the Sparrow, and will not let one come within a stone's-throw of his house. I have seen the martin fight for former nesting sites, and come off best man every time. (August 26, 1886. Present eighteen years.)

Caldwell. Marcus S. Crane: It drives away the bluebird, wren, martin, and chipping sparrow. It has battles every year with bluebirds for the possession of bird-houses. Last July it drove some martins from their nests under the eaves of my brother's barn, and two years ago they drove some from the nests under the eaves of a neighbor's house. (February 19, 1884. Present about fourteen years.)

Hackensack. Weldon F. Fosdick: I have never noticed any trouble between the Sparrow and other birds. (August 26, 1886. Present fifteen years.)

Orange. Lloyd McKim Garrison: City and suburb. It molests and to some extent drives away the wren, bluebird, downy woodpecker, purple martin, cliff swallow, and barn swallow. (February 11, 1884. Present many years.)

Plainfield. F. T. Cuthbert: It has been observed to drive away from their former nesting places the robin, bluebird, thrushes, song sparrow, and catbird. (February, 1887.)

Ridgewood (country). Henry Hales: I have not seen it molest our native birds except in struggles for nests, and by crowding out from near the buildings bluebirds, chippies, and wrens, and in winter our tree and song sparrows. I have a number of nest-boxes up on trees, intended for bluebirds, wrens, and purple martins. If the Sparrow occupies them I find no inclination in wrens or bluebirds to dispossess them; they would rather go off, and so get crowded out. I have no martins now. I have not seen any bird reclaim its nest. (January 18, 1887. Present about fifteen years.)

Tuckerton. S. Jillson: It takes possession of all the boxes put up for bluebirds and martins, and will soon occupy all the hollow trees and woodpecker holes. (February 10, 1884: Present about eleven years.)

NEW YORK.—*Alfred Centre.* F. S. Place: Last spring I saw the Sparrow and house wrens quarrelling over a hole in the limb of an apple tree. This was kept up for several days until the Sparrow finally succeeded in driving away the wrens, when it nested there. (1885.)

Bay Ridge. J. A. Perry: It is supposed by many persons that the English Sparrow is highly destructive to our native songbirds, and the regret has frequently been expressed on that account that they should be suffered to live and accumulate in such vast numbers. But the writer, who has had ample opportunity to observe the habits of these birds, is confident that the opinion entertained of their destructiveness is a popular prejudice, and is not substantiated by facts. Large numbers have made the rural residence of the writer their home for many years, as have also some fifteen or twenty tribes of songsters, and not a single instance has been observed of a conflict between them. The Sparrows quarrel among themselves, but they do not appear to interfere, in a belligerent way, with other tribes of birds. (For the Journal of Commerce. New York City, January 24, 1880.)

Bay Ridge. B. C. Townsend: As regards the peaceful relations of the English Sparrow to other birds, my experience confirms the testimony of my neighbor, Mr. J. A. Perry, with the exception of a single case. There were certain swallows building their mud-nests under our front porch, which nests they attacked with great violence and destroyed, driving the birds away. The simple attempt to destroy the nest of wrens upon the rear porch was unsuccessful, as the little wrens fought with great desperation, and finally drove them entirely away, remaining during the season, and rearing two broods of young. (March 27, 1886.)

Binghamton. H. J. Gaylord: The bluebird, martin, and wren will resist encroachments if in possession, and sometimes with success. I have on my place ten or twelve bird-houses for bluebirds, wrens, and martins. If the Sparrow is in possession of a box it will invariably hold it, as the other birds will not contest their rights. (October 7, 1886. Present about fifteen years.)

Brooklyn. Olive Thorne Miller: I have closely watched the birds around my house in Brooklyn for four years. The first and second years there were at least two pairs of robins and one or two pairs of Baltimore orioles which nested in my neighborhood, and which I saw and heard every day. The third year there was one pair of robins and one pair of orioles, and the fourth there have been neither robins nor orioles, except as rare visitors from some other neighborhood. I have noticed also in Prospect Park [Brooklyn] that as the Sparrows penetrate farther in the native birds retreat. From my windows I have many times seen Sparrows follow a robin or an oriole from tree to tree, flying closely after him, and alighting when he alighted, not attempting to touch him, but evidently annoying him very much, for he always appeared uneasy, and never staid long. There is near me a bitter-sweet shrub, and every year, in October and November, when it is full of berries there come to it several thrushes, I think the hermit thrush (*T. pallasi*). I have to-day seen Sparrows collecting in the trees near, all violently calling, in their loud, harsh way, as they do when danger approaches. On looking closely I saw two thrushes, which have been about for a week or more, trying to eat the berries. Every time one of them flew a Sparrow would fly after it. The thrush was annoyed and would leave the bush where it was eating, and alight on the fence. The Sparrow would alight too, and be ready for instant flight the moment the thrush started.

I once saw Sparrows in the same way attempt to mob a cat-bird, but a cat-bird is not to be worried, and he easily put to flight the whole party. From what I have seen of them, I think Sparrows keep away other birds partly by annoying them in the way I have mentioned and partly by filling with their nests and noisy broods every nook and corner in which our own birds could build. I have seen them persistently follow and hustle robins, thrushes, and orioles. Cat-birds are not so easily driven off, and will generally stand their ground. Mobbing is the Sparrow's favorite method, and I have seen it employed against a solitary red squirrel that had lived for two or three months in the trees of the neighborhood, and even against a cat which climbed a vine where nests were placed. (1884.)

Brooklyn. Hon. Nicolas Pike: Though the Sparrow is a most pugnacious bird, I do not think it drives our birds away, for it is my belief most are a match for him.

It is true they are not plentiful as formerly in Brooklyn, but it is from the increase of population. Whole streets and avenues of houses are now standing where not many years ago were thick woods where I went gunning. *Our* birds have gradually *retired* to the country, where they find quiet and congenial food; but the Sparrow has remained, as it rather likes noise and bustle, and can find fitting food, under almost any conditions, anywhere.

Go to Prospect Park, where hundreds of pretty songsters have a secure refuge, and rear their young in peace. Now, I do not know any place where Sparrows most do congregate as they do in this same park. It is a pleasure to me every summer to watch them bathing, forty or fifty at a time, on the margins of the ponds, and I never saw them interfere with our charming chats, yellowbirds, robins, catbirds, etc., that come down and share the bath with their English cousins. (February 8, 1884. Present about thirty-four years.)

Canaseraga (country). E. S. Gilbert: It has taken the nests of the mud swallow (*Petrochelidon lunifrons*), driving away the rightful owners. (August 23, 1886. Present one year or less.)

Constantia. Wallace D. Rhines: I have a martin-house which is claimed by the martins as soon as they arrive, and is kept. I have never noticed the martins molest a Sparrow except near their house. The martins arrived May 13, 1886, and found their house occupied by Sparrows, and containing young and eggs. I saw the martins drag out the young and kill them, and also carry away the eggs. (August 23, 1886. Present four or five years.)

Gansevoort. Joseph W. Shurter: I have observed instances in which the bluebird resisted the Sparrow, but most of our summer birds yield their ground without an effort at defense. In two cases the bluebirds attempted to regain possession of boxes put up for them, but were unsuccessful until aided by a few charges of shot sent where they would do the most good. I have observed numerous contests between Sparrows and various other birds, in which the Sparrows were evidently the aggressors, and this fact, taken in connection with the decrease of other birds, I think justifies the statement that the Sparrow molests and drives away most of our song-birds. (February 4, 1888. Present about eight years.)

Ithaca. George Donaldson: I have seen it drive the bluebird from its old home and occupy it; also, downy woodpeckers from their previous abode. (1885.)

Lockport. Lewis H. Hill I have never seen the Sparrow interfere with other birds. This year we have quite a good many Sparrows and robins, and one nest of wrens. Formerly we had some bluebirds and orioles. I do not know whether the Sparrow drove them away or not. (September 3, 1886.)

Long Island City. W. F. Hendrickson: A few years ago nests of the robin and oriole were very common along the roads here, and in the gardens were numbers of wood thrushes, catbirds, and other birds; but now there are hardly any nests of the robin or oriole to be found on the trees along the roads, and the birds are gradually becoming scarce in the gardens. The Sparrow now builds in the woods also, and I suppose that in the course of a few years more it will have entirely supplanted the other birds. (October 22, 1885.)

Lyons. J. S. Roys: It has been observed to molest and drive off robins and meadow larks, and other song-birds seem to have decreased since the introduction of the Sparrow. (October 26, 1886. Present several years.)

New York. A. Church: I have seen them in villages where there was a great variety of other birds, and they did not molest them. I have seen a robin's nest within a few feet of where the Sparrow was nesting, and in one place I saw the bluebird occupying one part of a Sparrow house and the Sparrow the other at the same time, and the entrances to the house within three inches of each other. There was also a nest of the phœbe bird within a few feet of this same house. (March 27, 1884.)

New York. W. A. Conklin: It molests and drives away the indigo bird, bluebird, yellowbird, and wren. (July 6, 1884. Present twenty years or more.)

New York. Dr. F. Hollick: I have a bird house which has now been occupied for three years in succession by bluebirds, right among a large flock of Sparrows, in my own garden; a robin also builds every year in a tree close by, under which the Sparrows congregate every day. I believe that it is the small boy and the shotgun that drive away our native birds from inhabited places, and when they are gone the Sparrows, who alone can withstand these enemies, are accused of driving them away. (September 2, 1884.)

Old Westbury. John D. Hicks: There is no conflict between the Sparrow and the birds in our locality, except with the bluebird and wren, which compete for nesting places. The Sparrow by first occupancy gets possession and holds it; consequently bluebirds are scarce. Wrens only succeed in building in houses with small entrances. (September 6, 1886. Present about twenty years.)

Painted Post. A. H. Wood: The common house-wren resists the encroachments of the Sparrow with great success, dumping out the whole business, eggs and all; the purple grackle also does so to a certain extent. Barn and cliff swallows and bluebirds resist with poor success. I have not observed the Sparrow to drive off any of our native birds. The trouble is that it takes possession of desirable nesting places, and when other birds arrive the Sparrows are fully established, and the native birds are compelled to go elsewhere. Formerly bluebirds nested very freely in this village, but since the Sparrows have become numerous they have entirely disappeared from their nesting places. (August 10, 1886. Present about ten years.)

Plattsburgh. G. H. Hudson: I have seen six or eight Sparrows follow a robin about, and seize upon and appropriate each earth-worm which he dragged from the ground. (1884.)

Rochester. Henry Harrison: I have never seen any of our native birds attempt to drive away the Sparrow, but it takes possession of any nest it wishes. A robin built a nest for three seasons in a tree opposite my window, and the Sparrow drove it away. It also drives away orioles and woodpeckers. (August 23, 1886. Present about fourteen years.)

Schuylers Lake (country). La Grande Southworth: I have seen the downy woodpecker attempt to drive off the Sparrow, but he was always defeated. The Sparrow also attacks bluebirds and robins, and I have seen it occupying a robin's nest, but never saw the robin attempt to reclaim the nest. (December 2, 1886. Present about six years.)

Sing Sing. Dr. A. K. Fisher: Before the advent of the House Sparrow, and before he had become fully established, the wood-thrush (*Turdus mustelinus*), robin (*Merula migratoria*), Baltimore oriole (*Icterus galbula*), purple martin (*Progne subis*), house wren (*Troglodytes aëdon*), catbird (*Galeoscoptes carolinensis*), and a number of other species, were common summer residents in the village, building their nests in the large door yards. For years they have been rarely known to breed except in the outskirts of the village. The purple martins have disappeared from the locality, with the exception of one colony, which still occupies a large martin box at the State prison.

Once a pair of kingbirds attempted to build a nest in one of the large sycamores which stood near the old Baptist church in the center of the village. They finally had to abandon this site, for the Sparrows would fly up in the absence of the kingbirds and remove the material as fast as it was deposited.

The habit of the Sparrow in following the robin and snatching particles of food from its bill was noted by the writer in a letter to Dr. Coues, published in the American Naturalist for December, 1882, p. 1009. (1885. Present about nineteen years.)

Syracuse (city and country). Edwin M. Hasbrouck: One case has come under my notice where a robin had partly finished a nest in a maple tree when the Sparrow took possession and completed it after his own ideas. This was blown or torn down, and two years after was occupied by the robin, but the Sparrow has possession now. It molests and drives off warblers, thrushes, flycatchers, orioles, and the goldfinch, wren, bluebird, and purple grackle. (August 20, 1886. Present twenty-two or twenty-three years.)

Tully (country). J. A. Dakin: I have seen the butcher-bird and kingbird drive it away without being first attacked. The purple martin is the only bird I have noticed attempting to reclaim former nesting sites. I saw several of these last May fighting for the possession of a former nesting house which the Sparrow was then occupying. The robin and eave swallow (*lunifrons*) have been expelled to a considerable extent. (September 10, 1886. Present about eight years.)

Watkins. H. C. Griswold: Last spring, when the straw stacks were torn down, about sixty Sparrows, which were thus deprived of a place to roost, came to the evergreens in the front yard and pitched battle with four or five pairs of purple finches. They drove the finches from the place they had frequented for years, and even whipped or discouraged a hen so as to make her look elsewhere for shelter. At a neighbor's, where seventy or eighty martins build their nests under the eaves, they drove them away after a few days' fight, so that now the Sparrows have sole possession. (September 30, 1885.)

West Farms, New York City. Jas. Angus: There is but one serious objection to the Sparrow, and that is that it annoys and keeps away the wrens and bluebirds; but I protect the wrens by contracting the opening to their house; if it is made just large enough for the wren it is too small for the Sparrow, and there will be no trouble. (February 11, 1884. Present fifteen or twenty years.)

NORTH CAROLINA.—*Graham.* Robert J. Thompson: A resident of the town of Graham told me that he had seen the Sparrow attack and kill all kinds of other birds and their young; that he had seen as many as a dozen Sparrows attack one bird. The summer sparrow and wren seem to be the birds which suffer most, but robins and bluebirds are also attacked. (Rock Creek, N. C., March 7, 1888.)

Raleigh. T. C. Williams: It is driving out our native sparrows, mockingbirds, and other small birds that formerly abounded in and around country villages and towns. (September 2, 1886. Present about five years.)

OHIO.—*Aberdeen.* George Sibbald: In 1884, when the oats were ripe, I saw a flock of Sparrows sitting on the fence that inclosed the field—the first I had seen outside the city or village. In 1885 a few built their nests and hatched their young in and about my dwelling-house. In the year 1886 they came in large numbers and drove all the native birds from the trees in the front yard, and built their nests in and about the house as before. In the spring of 1887 I had all the old nests thrown out and every hole and crevice stopped up. They came in great numbers, but only one pair found a place to hatch—the others all left. The native birds returned to the trees and bushes in my yard and reared their young. A visitor at my house, who had been traveling much this season, said I had more birds than any place he had seen, and named four or five different kinds which had nests on the trees. (June 10, 1887.)

Burton (country). P. W. Parmelee: The martin and bluebird have held their own with the Sparrow, but the robin, swallow, yellowbird, catbird, and phœbe have no show with it, and have almost entirely left this part of the country. All the above-named birds and the wren have nested on my place, mostly in nests occupied the previous year, until within a year or two. (September 1, 1886. Present about five years.)

Cincinnati. William Hubbell Fisher: The only birds to be found in the city now are the Sparrow and the domestic pigeon. (September 9 1884).

Cincinnati. Dr. F. W. Langdon: It has replaced to a very large extent the bluebird, martin, and in some neighborhoods the house and Carolina wrens, that formerly bred in boxes put up for them. A bridge within the city limits, formerly occupied by hundreds of cliff swallows, has for several years past been tenanted almost exclusively by the Sparrows. (November, 1885.)

Circleville. Dr. Howard Jones: The wrens are not equal to Sparrows in fighting qualities, so far as I have observed, and the house wren, Bewick's wren, and the great Carolina wren are molested and driven off. (August 19, 1886. Present about eight years.)

Cleveland. Dr. E. Sterling: When few in numbers they did not molest our native birds, but now that they have waxed strong and fat, no native birds are left. Last spring I saw a gang of them kill outright a robin on the public square. Ten years ago I counted 192 nests of native birds on two and one-half miles of Euclid avenue; this last season you could hardly find a dozen, and there is no other cause for their disappearance than these little pests. I have seen them tear up the nests of other birds and break the eggs; have seen them drive an old hen and her brood from their Indian-meal food by force of numbers; and even our tomcat had to back out when about to try his hand on a fledgeling. The kingbird is the only one that holds his own with them; he breeds here undisturbed. (February 25, 1884. Present about fourteen years.)

Columbus (suburb, Ohio State University). William B. Alwood: I have never observed a direct conflict between the Sparrow and other species. His lordship simply appropriates the choice localities, and other species acquiesce in his occupancy. (July 16, 1887.)

Columbus. Dr. J. M. Wheaton: It molests and drives away the house wren, bluebird, wood pewee, chipping sparrow, and a few other city birds. I am satisfied that in our city fewer birds make their appearance than before the Sparrow was introduced. (April 18, 1884. Present about twelve years.)

Garrettsville. A. J. Smith: I have known the martin to hold possession when attacked by the Sparrow, and the Sparrow to take the lower tier of boxes in the same house with the martin. I have known the Sparrow to take possession of the robin's nest after the robin had raised one brood in it. (October 27, 1886. Present about five years.)

Laurel. Daniel Bohl: I have seen this pestiferous little bird destroy the nests of our robins, and this spring I tore its nests out of a martin box which I have set up four different times, yet it persisted in building; but I never ceased until the martins had taken full possession. These troublesome imps drive the martins away and I have seen them drive out our native barn swallows and take full possession of their nests. (August 6, 1887.)

Metamora. H. C. Somes: The English Sparrows are too numerous here. We had no phœbes in their old place last spring except for a few days. My hummingbirds were all gone last year, and there were no yellowbirds or wrens, and but few meadowlarks and robins. (February 13, 1888.)

New Lisbon. J. F. Benner: It does not drive off any native birds to my knowledge. In the spring a martin-box on my premises is taken possession of by the Sparrows; the bluebirds will fight them, and sometimes get possession of a part of it until the martin comes, when both have to vacate in a hurry. (August 27, 1886. Present about six years.)

North Bend (suburb). R. H. Warder: The house wren and bluebird are driven off by the Sparrow. The great crested flycatcher and bluebird sometimes reclaim former nesting places, but rarely. (November 27, 1886. Present about eleven years.)

Oxford (country, 1 mile from village). L. N. Bonham: Jay-birds and robins resist and attempt to drive off the Sparrow, but it never leaves. A few years ago the bluebirds attempted to reclaim their nests, but they have given up the contest, and I never see them now; they have been driven off my farm entirely by the Sparrow. Mr. E. P. Wetmore, of the Oxford Farmers' Club, tells me of a long contest in his dooryard between Sparrows and robins. The barn swallows also have all gone since the Sparrow came. (Columbus, Ohio, November 29, 1886.)

Wakeman (country). W. B. Hall: It is saucy and aggressive. I have seen it drive the bluebird, wren, barn swallow, and downy woodpecker from their nests. It does not seem to be endowed with individual courage, but moves in flocks and overcomes by force of numbers. (1885. Present about four years.)

West Berlin (country). C. H. Shaw and J. P. Roloson: We have seen them fight bluebirds for weeks at a time, and also fight robins in order to get their nest and build it over for themselves. Martins, too, are molested and driven away. (September 8, 1886. Present about three years.)

PENNSYLVANIA.—*Berwyn.* Frank L. Burns: I have frequently seen the Sparrow fight and conquer native birds, principally the house wren, and take possession of places formerly occupied by them. The most deplorable work of this pest has been to drive from their accustomed haunts the black martin (*Progne subis*). I know of scarcely a place that is now occupied by the martin where five years ago they were numerous. (January, 1886.)

Bryn Mawr. A. R. Montgomery; and Radnor. W. W. Montgomery: We have seldom, if ever, seen the Sparrow actually attack other birds, except in a fight for a nesting place, but have often observed their system of mobbing other birds, such as the brown thrush and cat-bird. This system seems to consist in sitting in a crowd, just out of reach of the object of their dislike, and "insulting" him, following him when he moves, and giving him no peace until he leaves the neighborhood. The result of their colonizing the neighborhood of a country house is soon apparent in the gradual disappearance of the native birds. (November 8, 1886.)

Germantown (suburb). Witmer Stone: Goldfinches (*Spinus tristis*), as well as robins, have been frequently driven from the premises by the Sparrows. (November 9, 1886. Present thirteen years or more.)

Germantown. William Rotch Wister: The English Sparrow *has not driven away, and can not drive away,* our native birds from their former haunts. About Germantown it abounds in large numbers, but robins, bluebirds, song sparrows, thrushes, and wrens are more numerous than they were twenty years ago, owing chiefly to the greater amount of protection in the way of shrubbery and the legal protection afforded to insectivorous birds. I observed two wrens contest an earthen crock, intended for a nest, with a pair of Sparrows which were already in possession when the wrens arrived. In the struggle the wrens were victorious. (March, 1886.)

Notwithstanding an immense number of Sparrows about Germantown, where I reside, it can safely be said that robins, chipping sparrows, song sparrows, wood robins [*Turdus mustelinus ?*], and small birds generally were never so numerous. Baltimore and orchard orioles are plenty. * * * I frequently hear it said that the Sparrows drive off our native birds, but when cross-questioned no one can give an instance of it. (November 30, 1886. Present many years.)

Lancaster. Dr. S. S. Rathvon: I have not seen it in the act of driving off our native birds. Mr. John C. Linville, an intelligent farmer of Gap, in this county, stated to me that the barn swallow (*Chelidon erythrogaster*) had entirely disappeared from his premises, and that this was also the case with other birds, but that the English Sparrow is abundant. Mr. Collins, of Colerain, reports the entire absence of swallows and blackbirds. The following species were common in the suburbs of this city twenty years ago, but have now all disappeared: Purple martin (*Progne subis*), catbird (*Galeoscoptes carolinensis*), house wren (*Troglodytes aëdon*), thistle finch (*Spinus tristis*), chipping sparrow (*Spizella socialis*), song sparrow (*Melospiza melodia*), Baltimore oriole (*Icterus galbula*), orchard oriole (*Icterus spurius*), bluebird (*Sialia sialis*), robin (*Merula migratoria*), chimney swift (*Chætura pelagica*), kingbird (*Tyrannus tyrannus*). About the time of the introduction of the Sparrow in my locality, there was said to be some conflict between the English Sparrows, bluebirds, and chipping sparrows, but none of the latter two have visited me for fifteen years or more, whatever the cause may be.

There are coincidental circumstances which have a tendency to discredit the Sparrow. For instance, fifteen or twenty years ago the swift (*Chætura pelagica*) was very abundant every summer in my immediate vicinity, but I have not noticed a single individual the present year, and they have been gradually disappearing for the past ten years or more; and yet I can not see how these should ever come in conflict with the English Sparrow. Again, about the same period or later, catbirds were common;

indeed, on one occasion I counted fifteen on a single Clinton grape-vine; but for ten years I have not seen one on the premises. * * * But all this is claimed by the friends of the Sparrow to be the result of the building improvements in the suburbs of the city. Of course this is worthy of consideration, but in the few walks I have taken in the country in the past season I never failed to find Sparrows in flocks of ten, twenty, or fifty, in the fields and among the trees and shrubbery, but not a native bird of any species. (October 8, 1886. Present sixteen years or more.)

Mansfield (suburbs of Pittsburgh, two and a half miles from city line). Dr. R. L. Walker: I do not know of a single instance of birds nesting in this place that the Sparrow has not tried to drive away. Alongside my garden a pair of robins built their nest, and only preserved it by dint of hard and constant fighting; and then only succeeded, as far as I can see, in rearing one bird. (July, 1887. Present about five years.)

New Lexington. Dr. H. D. Moore: While I have observed no fighting, yet while the song sparrow, chipping sparrow, summer yellowbird (*Dendroica æstiva*), swallows, and other birds formerly nested near buildings, they do not return. (September 13, 1886. Present about eleven years.)

North East. Harry E. McNichol: I have observed it engaged in driving off or chasing robins, orioles, wrens, bluebirds, and downy woodpeckers, although usually it seems to be afraid of the wren. (1885. Present six or seven years.)

Philadelphia. J. Percy Moore: I can not say from my own experience that this species has actually driven away other species of birds from this neighborhood, but I have often seen it engaged in fights with our native birds, in which it generally had the advantage. On one occasion (May 10, 1885) I observed a pair of Sparrows drive a pair of bluebirds from their nearly finished nest in a deserted flicker's (*Colaptes auratus*) hole. The Sparrow took possession, remodeled the nest, and laid one egg. The nest was robbed, however, and when the Sparrows deserted it the bluebirds returned, built a new nest, and laid five eggs. On April 22, 1885, when the purple martins first arrived in numbers, I witnessed a battle between about twenty of them and a larger number of Sparrows. The latter had built their nests in several large bird-houses, in which the martins had been accustomed to breed year after year. When the martins arrived the Sparrows tried to prevent them from entering the houses, but after a long battle the martins were victorious, and the two species lived together during the whole summer, each raising its young. (September 7, 1886. Present twenty years or more.)

Philadelphia (suburb). F. R. Welsh: Wherever the Sparrow has become very numerous, other small birds of all kinds have diminished in numbers or disappeared, often without any apparent cause. On three occasions I have seen from two to four Sparrows defeated by a pair of wrens, and on one occasion a pair was beaten by a pair of bluebirds. The contest on each occasion was concerning a nesting place. I know of no other cases of actual hostilities, but have several times seen a robin fly when a flock of English Sparrows settled near it, though it would not have noticed a flock of crow blackbirds. (October 6, 1885.)

Robins are often molested. I have seen a Sparrow—always the male—hop around after a robin without any *apparent* reason except to make himself disagreeable. Occasionally the robin would vacate, but more often he would charge the Sparrow, which would fly away, sometimes returning, to be driven off again. (August 24, 1886.)

RHODE ISLAND.—*Newport.* John M. Swan, jr.: It drives away the robin and yellow warbler (*Dendroica æstiva*) frequently. In some instances these have been disturbed for the purpose of nesting places for the Sparrow; in others merely for the food in the shape of eggs and young. The blackbird and grackle in every instance successfully resist the advances of the sparrow. (September, 1886. Present five years.)

SOUTH CAROLINA.—*Abbeville C. H.* J. F. C. Du Pré: In this section the Sparrow is an unmitigated nuisance. Heretofore the old-field sparrow, bluebird, nuthatch, catbird, mockingbird, tomtit, flycatcher, thrush, bobolink, and wren have kept injurious insects down to the minimum, but now you seldom see one of these birds. Heretofore I have fed my native birds in the winter time on elevated, covered platforms with grass seed, millet, sunflower seed, etc., and have frequently had over two hundred of different kinds, but now a dozen or two are about all I can muster. (August 30, 1887.)

Charleston. Theo. D. Jervy: It has driven away from my garden the redbird (*Cardinalis cardinalis*) and the mourning dove (*Zenaidura macroura*). (March 15, 1886.)

Charleston. Dr. G. E. Manigault: It molests and drives away the orchard oriole (*Icterus spurius*), painted finch (*Passerina ciris*), and Carolina wren. (August 24, 1884.)

TENNESSEE.—*Lawrenceburgh.* W. T. Nixon: It seems to live in harmony with all our native birds except the bluebird, and only a chance rencontre is had with that, and this at nesting time. The bluebird is always victorious, never failing to secure the old nesting place. With this exception I have never seen the English Sparrow in contest with any of our native birds, although they are almost constantly in close proximity. (February 21, 1887. Present about two years.)

Paris. Dr. John T. Irion: Birds of value are decreasing as the Sparrow increases. The mockingbird a few years ago was increasing rapidly, but now it is seldom seen. (November 11, 1886. Present three years or more.)

VERMONT.—*Burlington.* Charles A. Davis: It drives off the robin. In the Burlington railroad station, where robins used to be plenty, there are now as many as fifty Sparrows' nests, and not one robin to be found. (1885.)

Hartford (country). Allen Hazen: I saw it drive away the tree sparrow (*Spizella monticola*) on January 21, 1885, and after that. (August 28, 1886.)

Saint Johnsbury. Rev. Henry Fairbanks: The song sparrow and the savanna sparrow, which until five years ago were exceedingly abundant here, have greatly diminished since the English Sparrow came. The latter are not good neighbors to the robins, thrushes, and vireos, and with fewer robins and thrushes the white grub and cutworm increase. (1885.)

West Pawlet. Dr. Frank H. Braymer: It molests the chipping sparrow, robin, martin, brown thrush, goldfinch, yellow warbler, etc. (February 15, 1884.)

I have also known it to drive off the bluebird, song sparrow, purple finch (*Carpodacus purpureus*), and greenlets (*Vireo*). * * * It drives away the cedar bird (*Ampelis cedrorum*), house wren, and catbird. (August 31, 1886. Present eleven or twelve years.)

VIRGINIA.—*New Market.* George M. Neese: The Sparrow has a bad name here, worse than it deserves. I do not think it has driven off a single native bird, although it fights the bluebird and the wren, but only for its own home. It is true it generally appropriates all the boxes and nesting places in the spring for its own use before the other birds arrive. Then, when the other birds (the bluebird and the wren) begin to look about for nesting places the fighting commences, and the Sparrow is always the victor. But bluebirds and wrens are quite as plentiful here as they were twenty years ago. The purple martins are not so abundant here as formerly; in fact, I have not seen one this year. Some attribute their disappearance to the Sparrow, but an old farmer told me that the martin was getting more and more scarce every year before the Sparrow came here. (December 30, 1885.)

There have been no purple martins here for the last few years, but I do not know whether or not it is the Sparrow's fault. The Sparrows commence their breeding season before the wren returns from the south, and appropriate every available nesting place. When the wren comes it generally fights a few days for its old home, gets whipped in consequence of numbers, and seeks a place the entrance of which is too small for the Sparrow. Last winter I closed a box in which a pair of wrens had nested last year, and in the spring when the wrens came I opened it. The Sparrow took possession of it immediately. The wrens fought nobly, but the Sparrows were so plentiful that I thought the wrens had a bad show for success, and I closed the box again, but put a small oyster can, with an opening just large enough to admit the wren, on a tree about six feet from the box of contention. The wren built in the oyster can and the Sparrow built on top of the closed box. They had a few fights during nest-building, but each reared its brood. (August 27, 1886. Present about twelve years.)

WEST VIRGINIA.—*Bethany.* M. E. Brown: It drives other birds away by robbing their nests and fighting them. A whole colony will go to the rescue of one. (November 12, 1886. Present about six years.)

Buckhannon. Dr. J. R. Mathers: The martin, bluebird, robin, wren, and catbird are all able to drive the Sparrow, but they sometimes have considerable strife before they succeed. Every spring the martins can be observed driving the Sparrow from the boxes that they occupied the previous year, and the robin and bluebird do the same. (August 19, 1886. Present five years.)

Elizabeth. Z. E. Thorn: The wren and bluebird seem to have become overpowered by the numbers of Sparrows, and have nearly all left this section of country. They seemed to be a match for the Sparrows until overcome by numbers. None of our native birds molest the Sparrow unless first attacked. (November 4, 1886. Present about two years.)

Halltown (town and country). John H. Strider. The English Sparrow drives off all other sparrows, the wren, martin, and all insect-eating birds; in fact, all our small birds, except the kingbird, and perhaps the catbird, which seems to hold his own against it. (September 6, 1886. Present about seven years.)

New Martinsville. Ben. M. Welch: It drives almost all other birds away. Whole flocks will attack one bird, and it is bound to give up. (November 12, 1886. Present five or six years.)

WISCONSIN.—*Clinton.* C. N. Crotsenburg: The yellow-shafted flicker (*Colaptes auratus*) has been repeatedly attacked and is able to withstand them only just so long as he stays in his hole; when outside he is obliged to retreat. (April 23, 1887. Present about eight years.)

Janesville. H. L. Skavlem: I do not know that the Sparrows have taken up the nesting places of our native birds. This summer a robin nested in one of my shade trees, and I noticed repeatedly that Sparrows would alight in trees near by, and the robin would drive them off. I do not believe there are any less native birds here now than before the Sparrow came. (August 24, 1886. Present about ten years.)

Kewaunee (country). Ransom A. Moore: In several instances the Sparrows have attacked other birds, and at such times keep themselves in a body and help each other. (November 8, 1886. Present about two years.)

Milwaukee. Walter B. Hull: In resisting the Sparrow's encroachments the kingbird is the most courageous; a few robins always show fight, but all kinds are outnumbered and almost invariably defeated. (August 23, 1886. Present about six years.)

Milwaukee. Charles Keeler: The Sparrow has recently found its way into the country about here, and the American goldfinch (*Spinus tristis*) has become quite scarce in places frequented by it. The food of the two birds is similar, and if one or the other must give way it will be the goldfinch. (August 21, 1886. Present about fifteen years.)

CANADA. ONTARIO.—*Belleville.* Prof. James T. Bell: The robin and grackle are the only birds I have observed which resist or attempt to drive off the Sparrow, and their success is only temporary and partial. A Sparrow will summon his fellows to fight with a robin, but they appear to be afraid of the grackle. Purple martins defend their nests against the incursions of the Sparrows, on Front street, Belleville, but these are the only birds I have seen so engaged. The Sparrow molests and drives off the bluebird, gold-finch (*Spinus tristis*), and small finches and warblers in general. (August 19, 1886.)

Mr. Thomas Walker, of the township of Rawdon, who resides some 26 miles from this city, a few days ago gave me the following facts in regard to the English Sparrow. It first appeared on his farm in 1885, when two couples came early in the spring and took possession of two swallows' nests under the eaves of his barn. When the swallows returned they set upon the intruders, tore down the nests, and threw the eggs of one couple and the four newly-hatched young ones of the other to the ground, and drove away the parent birds, which appeared no more.

Early in the present year a pair of Sparrows came to the barn, and occupied a nest as before. On the arrival of the swallows, they again attacked the Sparrows with rapid evolutions and shrill twitterings. Next morning Mr. Walker found four partially fledged nestlings and the old cock Sparrow lying dead on the ground. The hen bird took refuge in the porch of the dwelling house, where she was fed by the family for a few days, when she also disappeared. (October 4, 1886.)

Belleville (country). William L. Ponton: The number of other birds (except blackbirds) has been much diminished of late years here through the ferocity and persecution of these little marauders, whose pluckiness is worthy of a better cause. (September 27, 1884.)

Cottam. W. E. Wagstaff: The barn martin alone attempts to reclaim former nesting sites when these are occupied by the Sparrow. I have not observed the Sparrow to molest or drive off native birds. (August 28, 1886. Present about six years.)

Hamilton. Thomas McIlwraith: No other bird is tolerated where the Sparrows have settled. I have seen them eject swallows, bluebirds, and house wrens from their nests. The robin holds his own by superior strength, but should a casual visitor of smaller size and timid nature appear, the Sparrows leave their own fight unsettled and unite in driving the stranger off the premises. (March 10, 1884. Present about 10 years.)

London. W.E. Saunders: In four years from its introduction it ousted from our house and one house on each side three pairs of robins, two pairs of bluebirds, three pairs of white-bellied swallows, and one pair of wrens. Our city is full of trees, and I have seen orioles, high-holders, jays, redheads, and other similar birds close to the business part of the city before we had this intruder. Now not one is to be seen for every five that were here seven years ago. Then our city was full of barn, eave, and white-bellied swallows, chimney swifts, and martins. They were *thick* among the stores all day; now only the chimney swifts and martins are left, and they in reduced numbers. The following birds were much more numerous in the city before the advent of the accursed stranger: The chippy, robin, yellow warbler, warbling vireo, wren, bluebird, white-bellied, eave, and barn swallows, and oriole. (December, 1885.)

Pembroke. E. Odlum: The Sparrows fight fiercely among themselves, but I have not seen them attack other birds, and their nesting does not interfere with them. If there be any interference with any other bird it is with the robin, as it appears to be getting scarcer in Sparrow centers and more general about woods. (August 25, 1886. Present about twelve years.)

Plover Mills. R. Elliott: I should say that the Sparrow is invariably the aggressor, and all birds molested simply act on the defensive. I have known the phœbe (*Sayornis fusca*) to fight persistently, in two cases unsuccessfully, in one successfully.

Three years ago (1883) a Sparrow, in the month of March, began to remodel a phœbe's nest; the second week in April the phœbes came, tore some straw out and guarded their home. The fight lasted ten days, when the Sparrows (the first pair at my barn) left. This year, 1886, a pair occupied an old nest of the summer warbler, close to a window. The warblers had been there for four or five years previously, but disappeared this year.

The eave swallow (*lunifrons*) often finds its old nest occupied by *domesticus*, which invariably holds the fort in spite of all the attempts made to dislodge him, but the swallows rebuild, I fancy. The bluebird generally keeps his old quarters. (September 6, 1886. Present about five years.)

Strathroy. L. H. Smith: I do not believe he is guilty of driving away our native birds as badly as represented. I have watched him for twelve years, and but one case of fighting with our native birds has come under my notice. On my place of 12 acres I had two or three pairs of cat-birds, one or two pairs of Virginia yellowbirds, one pair of phœbes, several song and chipping sparrows, orioles, house-wrens, etc. Some seasons I would miss a pair, and at another season perhaps one kind would not be represented at all. For instance, after the phœbes' building under my veranda two years and under my cornice one, I missed them. I found how much bird life varied, what a great percentage of nests were destroyed by their natural enemies. As well as I could care for them, and as suitable a place as I had—acres of trees and shrubbery—I don't think on an average more than one pair of birds in five succeeded in raising a brood each season. Birds for some reason move, sometimes temporarily and sometimes permanently, from localities, and it is possible in some places they are fought with and driven away by the English Sparrows, but such an instance never came under my notice. The whippoorwill, the nighthawk, and the passenger pigeon, have almost left this part of the country. Surely the Sparrow did not drive them away. (October 11, 1886. Present about twelve years.)

Toronto. Dr. William Brodie: It is generally admitted that it has driven away from cities, towns, and country villages a few native species, such as the chipping sparrow (*Spizella socialis*), bluebird (*Sialia sialis*), house-wren (*Troglodytes aëdon*), yellow warbler (*Dendroica æstiva*), cliff-swallow (*Petrochelidon lunifrons*), tree-swallow (*Tachycineta bicolor*), and a few others, species which were taking perhaps rather sparingly to our bustling centers. (January, 1888.)

QUEBEC.—*Montreal.* Ernest D. Wintle: Last spring I observed a pair of summer warblers (*Dendroica æstiva*) build a nest in a tree, when the Sparrows drove them away and built a nest for themselves right on top of the warbler's, so that you could not see any part of the latter's nest. (September 20, 1886. Present sixteen years or more.)

NEW BRUNSWICK.—*Portland* (suburb of St. John). J. W. Banks: A friend of mine showed me a myrtle warbler which he saw killed by the Sparrow. (October 10, 1886. Present two or three years.)

NOVA SCOTIA.—*Two Rivers.* B. B. Barnhill: I have seen it fight with the barn swallow and attack crows. (August 20, 1886.)

ENGLAND.—It always raised my ire as a boy to see them steal the nests of the eave or window martin. I have many times perforated the piping over such nests with shot to kill the rogues. I have but little acquaintance with them in America. (David H. Henman, Willows, Dak., December 12, 1886.)

BERMUDA.—I am informed by a relative who spent last winter in Bermuda that nearly all the beautiful birds of that island have been expelled by Sparrow usurpers, which are innumerable, and devour fruit and grain, and foul porches, walks, roofs, and windows. Negro children are there constantly employed to kill them. My informant is observant and merciful, but says that once naturalized in a foreign country the Sparrow becomes vicious. (W. N. Ponton, M. A., Belleville, Canada, September 27, 1884.)

RELATION TO INSECTS.

The testimony on this subject came from five hundred and ninety-one observers, of which number one hundred and thirty-six sent replies of such a nature as to allow of complete summarization, and in two hundred and seven other cases a part of each report may be so treated. The following lists show the character of the evidence which can be thus condensed.

Among the replies to the question *Under what circumstances does the Sparrow feed on insects?* the following were received:

	Reports.
Under no circumstances whatever	10
Under no circumstances, so far as observed	50
Have never known it to eat insects	12
Think not under any circumstances	5
Rarely, if ever	9
Rarely	10
Never to any extent	4
Occasionally	9
Only as a last resort	2
Only when starved to it	7
In case of extreme necessity	4
When very hungry	2
When seed is scarce	4
When grain is scarce	4
When it can get no grain	25
When it can get no grain or fruit	6
When it can get nothing else	22
When other food is scarce	10
When insects are abundant	3
Mostly in winter	2
Mostly in summer	5

	Reports.
Mostly in spring	3
Mostly in fall	1
In winter and spring	2
In early spring	6
In spring	4
At all times	6
At nearly all times	2
Whenever it can get them	5
Under all circumstances	5
It carries insects to its young	25
It feeds its young mainly on insects	5
It takes a few insects to its young	7
It takes a very few insects to its young	2
It takes insects when feeding its young	24
It takes insects only when feeding its young	3
It takes insects especially when feeding its young	8
It takes insects mainly for the young	7
It takes insects during the breeding season	13

Among the replies to the question *What kind of insects does it destroy?* were the following:

	Reports.
All kinds	9
Nearly all kinds	2

	Reports.
Few of any kind	2
None to any extent	9

In response to the question *Has any case in which it has been of marked benefit to the farmer or horticulturist come under your notice?* twenty-seven observers replied in the negative and thirty-nine in the affirmative. The latter in most cases stated the manner in which the benefit was derived, and almost all such reports have been printed in full.

The remainder of the testimony in relation to the Sparrow's insectivorous habits consists of reports from about four hundred and fifty observers, and its character will be fairly shown by an examination of the following examples, in connection with the summaries given on pages 101 and 102 of this Bulletin.

ALABAMA.—*Centre.* J. J. B. McElrath: It eats the caterpillar of fruit trees and grape vines. (September 20, 1886. Present two years.)

Eufaula. E. L. Brown: My impression, founded on observation only, is that it does not feed upon insects at all. (September 17, 1886. Present four or five years.)

ARKANSAS.—*Helena.* J. O. Bagwell: It will not catch a grasshopper or other insect as long as it can get a living in the streets. (September 20, 1886. Present three years.)

Lonoke. A. F. Huntsman: It destroys worms, bugs, and insects in the gardens and fields early in the spring, feeding constantly on almost every kind of insect and larva. (September 23, 1886.)

Osceola. Dr. D. A. Richardson: Mr. Bacchus, a druggist in town, tells me that during the summer he noticed the English Sparrows picking what he supposes to have been eggs of insects from the under side of the leaves of some mulberries near the store. (December 27, 1886. Present about six years.)

CALIFORNIA.—*Berkeley* (suburb). Dr. M. C. O'Toole: Spiders and moths are used as food for the young, but the Sparrow will devour that which is near at hand. He may eat insects of any kind if grain can not be had. It will be found that the Sparrow is not of any service to the farmer or any one else. It visits the fields *only* in harvest time, and then in flocks. (February 17, 1887. Present about three years.)

Eureka (suburb). Charles Fiebig: It eats insects, mostly caterpillars, when feeding its young. (September 28, 1886. Present fifteen months.)

Haywards. Dr. J. G. Cooper: It evidently prefers seeds, but is seen to catch flies, etc., when feeding its young. (February 22, 1884.)

Oakland and San Francisco. E. F. Lorquin: I have seen it catching flies, of which it is very fond, but I have never seen it feeding on worms or caterpillars. (August, 1887.)

San Francisco. F. Gruber: It eats flies, spiders, moths, butterflies, caterpillars, and the larvæ of insects, and feeds its young on the larvæ of insects, worms, and soft insects. The bird seems to prefer insects or grubs to seeds or grain in the winter season. * * * During the last four years I find that insects and garden snails have become remarkably scarce here. (March 5, 1884. Present nine years.)

San Francisco. William McK. Heath: A very *few* insects are fed to its young. (May, 1887. Present ten or fifteen years.)

San José. A. L. Parkhurst: They feed on various worms, caterpillars, and grasshoppers during the breeding season. (August 27, 1886. Present about five years.)

CONNECTICUT.—*East Hartford.* Willard E. Treat: It devours the canker-worm, goldsmith beetle, and various small moths. It feeds on insects mostly in the spring, during breeding time. (October 23, 1886. Present about eight years.)

Middletown. Walter B. Barrows: During May and early June (1886) the canker-worm (*Anisopteryx vernata*) was extremely abundant throughout the town, and nearly all the unprotected apple and elm trees were completely stripped of their foliage. While the worms were very small the Sparrows did not seem to notice them, but when one-third or one-half grown they began to collect and carry them to their young in large numbers. I frequently saw a dozen or more Sparrows on a single large elm close to the house, all busily collecting the worms, and each carrying away a bunch in his bill. The adult birds never seemed to eat any of these worms, but they certainly carried thousands each day to their young in the ivy close by. In spite of this, however, and the additional fact that many other birds were also feeding constantly on the worms, the elms were completely stripped of their leaves before the worms were fully grown, and they were thus compelled to spin down to the ground and travel off in search of other food. While thus moving off on fences, walks, and the ground I never saw the Sparrows touch them, probably because there were still many trees on which worms were to be found. It should be noticed in this connection that the canker-worm is a smooth-skinned span-worm, and a favorite food with almost all birds which habitually eat insects; while its great abundance so near the nests of the Sparrows will in part account for their feeding their young so largely on it. The moth of this species is most abundant in early spring, when the wingless female issues from the ground late in the afternoon, ascending the trees to deposit her eggs during the night. On favorable evenings in March and April of the season in question the grass and leaves beneath elm and apple trees were fairly alive with these wingless females distended with eggs. The robins ate them by hundreds, but I never saw an English Sparrow take any notice of them, although it occasionally chased the winged males, which were equally abundant and much more conspicuous. (July, 1886. Present about sixteen years.)

New Haven. Louis B. Bishop: It feeds on insects when no other food is plenty. I have seen it kill the cicada, canker-worm, and cabbage-worm, but very rarely. (August 23, 1886. Present fifteen years or more.)

New Haven. Robert D. Camp: I am positive that the Sparrow kills a great number of the canker-worms which infest our elm trees. I have seen the female bird alight on the perch of its house in front of my window with seven worms in its beak at once, and from my observations I should say that it would average three worms in every eight minutes during the day while raising its young. (April, 1887. Present fifteen years or more.)

New Haven. A. C. Sheldon: When feeding their young I have seen them resting on our window-shelf with from one to five worms in their mouths at a time. The worms were alive and wriggling, and were about three thirty-seconds of an inch in diameter by seven-eighths of an inch in length, and of a clear green color. The Sparrows, after resting a moment, flew to their nests, where I have seen them feeding these worms to their young. (April, 1887. Present fifteen or sixteen years.)

South Woodstock. Mrs. G. S. F. Stoddard: I have never seen them feed on insects, though watching them often in different places. (January 22, 1887.)

DISTRICT OF COLUMBIA.—*Mount Pleasant.* William Holmead: They are of no benefit to the farmer. They will only feed on insects when they can not get grain. Since the introduction of the Sparrow our gardens and fields have been devastated by insects, especially those which attack the cabbage, and only in the country, where the Sparrows are not numerous and our native birds are, can cabbage be raised. (November 8, 1886. Present fifteen years or more.)

Washington. S. M. Clark: They do not feed upon larvæ, but supply them to their young; I have watched them closely in this regard. (January 11, 1886.)

Washington. James Halley: For several evenings past I have seen the Sparrows catching the white moths of the web-worm, eating some and carrying others to their young. I saw at least twenty carried off by one pair of Sparrows in a short time. The moths only begin to leave their cocoons toward sunset, and do not fly much until it begins to grow dark, so that few birds can get them, and the Sparrows are surely doing some good in destroying them. (May 11, 1887.)

(Specimens of this moth were brought to the Department by Mr. Halley, and proved to be *Hyphantria textor*, the moth of the fall web-worm, one of the species which has been most injurious to the shade trees in Washington. Mr. Alexander McKericher, assistant gardener at the Department of Agriculture, was with Mr. Halley at the time the Sparrows were catching the moths, and testifies that he has seen them doing so at other times, as well as catching seventeen-year locusts and other insects.)

Washington. George Henning: I have seen it carry worms, cicadæ, May or shad flies, and other insects to its young. (March 6, 1884. Present fourteen or fifteen years.)

Washington. H. W. Henshaw: In 1885, during the prevalence of the seventeen-year locusts in this city and vicinity, the English Sparrow was observed to attack and destroy these insects in very considerable numbers. The same facts were observed by Messrs. R. Ridgway, C. V. Riley, and others.

Washington. William Saunders, superintendent of garden and grounds, U. S. Department of Agriculture: Some insects are eaten, mainly by the young in the nests. I have seen the old birds carry caterpillars (not hairy), black beetles, and grasshoppers to their nests. I do not think they will touch hairy caterpillars. (April 13, 1887. Present sixteen or seventeen years.)

Washington. Walter B. Barrows: Perhaps twenty times during the present summer I have seen a Sparrow with an insect of some kind in its bill. The insects which could be identified were: Cicadæ, once or twice; cut-worms, several times (two specimens identified by the assistant entomologist as *Nephelodes violans*), once or twice snatched from robins by the Sparrow; moths of the fall web-worm (*Hyphantria*), two or three times, and larger moths twice; three May flies (*Ephemeræ*), singly; one good-sized grasshopper. Sparrows were also seen to chase butterflies of several species and frequently *appeared* to be catching or chasing insects too small to see. (August, 1887.)

GEORGIA.—*Alpharetta.* William A. Porter: It has been of marked benefit from its destruction of the cabbage-worm, a soft, green worm resembling the tobacco-worm and very destructive to cabbage. It feeds on this worm under ordinary circumstances, as well as on flies, ants, gnats, and small bugs. (September 8, 1886. Present about two years.)

Atlanta. Hon. W. A. Harris: I do not think it feeds on insects. As a destroyer of the caterpillar it is a failure. (November 11, 1886. Present about ten years.)

Augusta. Dr. J. P. H. Brown: I know of no marked benefit. It destroys insects and their larvæ without stopping to discriminate between the injurious and beneficial. (September 5, 1886. Present about fifteen years.)

Buena Vista. Thomas B. Lumpkin: When hungry they go for all kinds of insects, but seem to prefer crickets and grasshoppers. (October 4, 1886. Present about two years.)

Carrollton. M. R. Russell: In the brooding season it destroys grasshoppers and cabbage-worms. (September 25, 1886. Present about four years.)

Griffin. J. H. Barnes: It is of no benefit to the farmer or horticulturist. It feeds on insects when there is nothing else. It never touches the cabbage-worm or the cotton-worm, the greatest pests of Georgia. (September 17, 1886. Present about six years.)

Lexington. John T. M. Hairn: It has been of marked benefit by eating the caterpillars from cabbage and grape-vines. (September 25, 1886. Present four years.)

Palmetto. Simeon Zellars: It feeds on insects generally, and especially while feeding young. (October 4, 1886. Present about four years.)

Savannah. J. N. Johnson: I have seen it feed upon moths and upon cut-worms on rare occasions. It has been of no marked benefit to farmer or gardener. (October 7, 1886. Present about eight years.)

ILLINOIS.—*Albion.* George Ferriman: It does considerable good by devouring small insects, moths, etc. I have seen it catching the moth and worms from all kinds of trees to feed its young. I think at times it destroys all kinds of insects. (September 3, 1886. Present about fifteen years.)

Alton. Hon. William McAdams: It destroys caterpillars and other larvæ that are found about the elms and other shade trees in spring. (August 23, 1886. Present about fourteen years.)

Bernadotte. Dr. W. S. Strode: In twenty dissections I have not found a single insect or worm in the crops. (September 7, 1887. Present two or three years.)

Carmi. Dr. Daniel Berry: Many years ago it was a common thing for a horse to die with the botts. This is a rare occurrence now, and I have been led to believe there is some relation between this immunity from fatal botts on the part of the horse population and the advent of the Sparrow. The Sparrow is a model provider for a family; none so busy as he when his young are unfledged. At such times his main source of sustenance is the horse dung of the street, and there, I believe, is where he does his good work in destroying the larvæ of that fly. But without any positive knowledge I make the suggestion of this relation between the Sparrow and the botts. (October 6, 1886. Present about ten years.)

Centralia. Jabez Webster: It feeds its young upon insects for the first seven or eight days. I have not observed it eating any particular kind except small grasshoppers; it prefers grain or fruit. (December 21, 1886. Present about seven years.)

Collinsville. Henry DeWald: In the spring of the year it feeds its young a great deal on caterpillars from trees, not from vegetables. (October 5, 1886. Present about twelve years.)

Freeburgh. Charles Becker: I have seen them catch army-worms by the thousand. Two years ago we had a timothy patch near the Catholic church, where Sparrows are abundant, which was attacked by the army-worm, but in a short time the Sparrows destroyed them. It was interesting to see the Sparrows fly into the meadow, catch a worm, and fly back to feed the young ones; and this they did to such an extent that the dead army-worms could be found around their nesting places, as I found by inspecting the nests with some other persons to whom I communicated my observation. When feeding their broods they also catch caterpillars, locusts, butterflies, etc. (September 30, 1886. Present about nine years.)

Griggsville. T. W. Parker: So far as I have noticed it destroys insects only to a very limited extent. I have seen it feed on grasshoppers. (September 22, 1886. Present about four years.)

Johnsonville (village). Jas. J. Johnson: In the brooding season it carries to its young a great many insects. The larvæ of the May-beetle seem to be a favorite food, and any other grub-worm or larva is taken. (March, 1887. Present three or four years.)

New Athens. August Gierschner: It has been of marked benefit to the farmer. In the spring it eats many of all sorts of caterpillars, and even during winter it picks off many larvæ wherever it finds them. It also destroys larvæ of butterflies, moths, and bugs. * * * I have not noticed that he destroys any of our most hurtful insects, such as the army-worm, chinch-bug, Hessian fly, potato-bug, etc. (October 5, 1886. Present about fourteen years.)

Quincy. J. H. Richardson: It destroys very few insects, if any. I can find no one of our farmers who thinks them a benefit; they all tell me they are a great nuisance. (October 4, 1886. Present about sixteen years.)

Roberts. E. O. Newman: In rearing its young it feeds them on all kinds of worms and small caterpillars. (September 27, 1886. Present about eight years.)

Rock Island. W. H. Hatch: I have never observed it feeding on insects, nor have I been able to find any on dissection. (October 25, 1886.)

West Belleville. George C. Bunsen: It will occasionally eat grasshoppers. (Autumn, 1885.)

INDIANA.—*Brazil.* D. W. Brattin: I have observed it closely, but never saw it feeding on insects, although the latter were abundant. (September 1, 1886. Present about seven years.)

Brookville. Amos W. Butler: The army-worm and seventeen-year cicada are more largely eaten here by the English Sparrow than by any other bird we have. (Autumn, 1885.)

Edwardsville. Edwin Yenowine: One case of marked benefit to the farmer has been noticed, viz, their taking cabbage-worms, I think for their young. (September 7, 1886. Present about four years.)

Evansville. Dr. William Weber: It has been of marked benefit to the farmer by destroying the white miller moth, cabbage-worm, and numerous other worms and insects when it has young. It does not destroy the common caterpillar so much, but prefers the moth. (October 15, 1886. Present about thirteen years.)

Greencastle. W. H. Ragan: It certainly feeds on injurious insects at times. I often observed it feeding on the seventeen-year cicada during their prevalence in 1885, and have also noticed it feeding on the tent-caterpillar, and in one instance on the fall web-worm. From good authority I am persuaded that it also sometimes feeds on the cabbage-worm (*Pieris rapæ*). (September 28, 1886.)

In regard to the fall web-worm, the case referred to occurred in August last. A single bird, industriously engaged in the midst of a web, seemed to be feeding on the larvæ. After observing him for some moments he flew down to the fence near me with a larva in his beak, and there deliberately devoured it. This is the only instance of the kind which I have personally observed, but my esteemed friend, Hon. Sylvester Johnson, of Irvington, this State, president of the Indiana Horticultural Society, has more than once reported having caught them in the act. (July 4, 1887. Present about fifteen years.)

Irvington. Hon. Sylvester Johnson: It destroys the cabbage-worm, and the plum-curculio when shaken from the tree. (September 20, 1886. Present about sixteen years.)

La Fayette. J. M. Dresser: It feeds upon insects when it can get nothing else. It has been seen to eat the cabbage-worm, but only when starved to it. I have never seen or heard of a bug or worm being found in the crop of an English Sparrow. (December 11, 1886. Present about twelve years.)

La Fayette. F. M. Webster: I have never seen it feed upon insects to any extent, except on the seventeen-year locust (*Cicada septemdecem*) and a grasshopper (*Melanopus femur-rubrum*). I think it prefers *Orthoptera* and the larger *Hemiptera*, and possibly *Neuroptera*. It takes insects when it can get nothing else conveniently. I have noticed recently that it catches grasshoppers, but this has only been going on since small fruits and grain have become exhausted. (August 25, 1886. Present about twelve years.)

Muncie. Granville Cowing: Its diet seems to be wholly vegetable, and it is regarded here as a great and growing curse to agriculture and horticulture. (November 29, 1886. Present about six years.)

New Albany. Jas. N. Payton: In this city and other places in the country, before it came we had a caterpillar plague every three or four years. * * * The caterpillar stripped all our shade trees except the maple and sugar tree of all their leaves. Since the Sparrows have become numerous, we have not had any trouble from caterpillars, and I believe the Sparrows did the work. (September, 1885. Present about twenty years.)

Richmond (suburb). Joseph C. Ratliff: It does not take insects unless when feeding its young. (November 5, 1886. Present about seventeen years.)

Tell City. John L. Huber: It has been of marked benefit in the destruction of the army-worm. It also eats the cabbage-worm, and all other worms infesting vegetation. It feeds its young upon insects. (October 8, 1886. Present about twelve years.)

Vevay. William R. Stratford: It destroys the cabbage-worm (a great pest in this locality), but I believe not more effectually than did our other birds before the advent of the Sparrow. (October 7, 1886. Present about ten years.)

IOWA. *Bellevue.* Dr. Lawrence Millar: I have observed it tearing the nests of the leaf-roller, and extracting the larvæ. I often see it carrying off beetles. It feeds upon insects during the brooding season. (October 27, 1886. Present about ten years.)

Burlington. Howard Kingsbury: It benefits the farmer by destroying countless numbers of codling-worms, larvæ of *Coleoptera*, and many varieties of *Aphidæ*. It feeds upon insects whenever it can get them—especially while rearing its young. (December 28, 1886. Present sixteen or seventeen years.)

Burlington. D. Y. Overton: It appears to be a scavenger, and lives but little upon insects; I have seen it attack and destroy a wounded grasshopper, but it exerts little effect on the worms or insects which infest trees and vegetables in the city. (March, 1886.)

Dubuque. Theo. W. Ruete: It feeds its young almost exclusively upon grubs, larvæ, and small insects. (October 25, 1886. Present eight or ten years.)

Iowa City. C. C. Nutting: It uses insects for feeding its nestlings, but not to any noteworthy extent. (October 13, 1886. Present about five years.)

Lenox. A. C. Brice: They certainly feed upon insects and their larvæ, especially when they have young. (October 8, 1886. Present less than a year.)

Newton. W. E. Dingman: It commonly eats insects in preference to grain. It has been seen to catch and eat the young of the grasshopper or locust, also the common horse-fly. It destroys to a great extent the bot-fly, melon-bugs of all kinds, and sometimes a honey-bee or wasp. (October 15, 1886. Present two or three years.)

Wapello. L. M. Jamison: Like other birds it uses insects in feeding its young brood. (October 11, 1886. Present three or four years.)

KANSAS.—*Garnett.* M. A. Page: It has destroyed millions of worms. It is a benefit especially to our apple orchards. I know that it destroys the codling-moth and miller. (September 3, 1886. Present about one year.)

Larkin. P. C. Sweaney: It does not destroy insects or their larvæ to any great extent. Its food is seeds, and not insects, as formerly supposed. It only feeds its brood with insects while very young. (October 7, 1886. Present about three years.)

Lawrence. B. F. Smith: I have never observed it feeding upon insects. It was brought here to look after the maple-worm, which frequently destroys the foliage of the maple twice in a season. It does not feed upon that worm nor does any other bird that I have observed. (January 12, 1887. Present about ten years.)

Manhattan. Dr. Charles P. Blachly: The maple-moth has been very injurious here, stripping the trees of foliage twice *completely* and partly a third time, in a season, and making it very offensive by their droppings and by covering sidewalks and fences in countless myriads. The English Sparrow *has not* been observed to molest them, though breeding extensively in buildings overshadowed by the maples which were completely defoliated by the worms. (November, 1885.)

Manhattan. Prof. D. E. Lantz: It feeds upon the *Cicada.* (Autumn, 1885.)

It has not been of any marked benefit. It feeds sparingly upon the maple-worm, so destructive to the maple in this locality. During the breeding season it feeds upon insects, and, although I have not investigated, I am satisfied that its food is largely of this kind during the early summer months. (September 2, 1886. Present about six years.)

Toronto. J. B. Stockton: I never saw it touch worm or fly. My trees were filled with green worms, eating the foilage; but I never saw a Sparrow interfere with one, while the other birds did. (October 6, 1886. Present about one year.)

KENTUCKY.—*Bloomfield.* John Allen Terrell: It destroys caterpillars, cabbage-worms, grasshoppers, and larvæ of every description, except that of the potato-beetle. It feeds upon insects under all circumstances. (October 5, 1886. Present about seventeen years.)

Bowling Green. Postmaster: I have personally examined the crops of twenty-seven English Sparrows this summer and not found a bug or worm. (October 3, 1886. Present about eight years.)

Columbus. F. H. Gardener: It does not seem to discriminate, but eats most small insects thrown in its way. (October 9, 1886. Present about three years.)

Crescent Hill. Thomas S. Kennedy: I have not seen it interfere with the cabbage-worm or its butterfly, with the codling-moth, or any beetles, cut-worms, or other destructive insects, except the hairy caterpillar. It feeds its young on insects, especially on the moth of the common hairy caterpillar. (October 5, 1886. Present five or six years.)

Elkton. E. W. Weathers: It seems to catch the worms from the cabbages especially. It feeds upon insects when rearing its brood, and destroys to a limited extent such as are common to the garden. (October 4, 1886. Present about six years.)

Greenville. C. W. Short: The extent to which it feeds upon insects is not worthy of notice. (October 11, 1886. Present about six years.)

Hartford. A. B. Baird: It feeds upon insects only from sheer necessity. In a very few instances it has been observed feeding its young on grasshoppers. (October 5, 1886. Present about six years.)

Lancaster. W. H. Wherritt: I think it feeds upon insects only when hard pressed for food. In a *few instances* I have known it to destroy the green cabbage-worm. (October 11, 1886. Present eight or nine years.)

Louisville. J. B. Nall: It feeds upon insects whenever it can get them. I have seen it eat cut-worms, and moths of various kinds. It has nearly exterminated the white caterpillar that a few years ago threatened to destroy our shade trees. It eats all kinds of insects to some extent. (September 8, 1886. Present about twelve years.)

Louisville. A. P. Farnsley, per J. B. Nall: I have seen English Sparrows, bluebirds, tame pigeons, and blackbirds feeding upon the cut-worm and army-worm. I am certain these birds saved me more in two seasons than they could possibly injure me in twenty years. * * * A few years ago I had a barley field infested with army-worms. After I cut the barley the worms commenced moving into an adjacent corn-field. I thought my corn would be ruined, but to my great delight the English Sparrows, tame pigeons, and blackbirds came to my aid in vast flocks, and picked up and carried off the worms as fast as they emerged from the barley field. (August 8, 1886.)

Maysville. A. C. Respess: It feeds upon ants and other insects in early spring. (October 6, 1886. Present seven or eight years.)

Shelbyville. Dr. Ormsby Gray: It has been of marked benefit in some cases. It feeds its young on the millers and butterflies of many destructive caterpillars, thereby destroying many broods. It destroys insects, however, only when rearing its young. (October 12, 1886. Present about eight years.)

Simpsonville. R. H. George: It eats some caterpillars and some innocent worms, but has been of no marked benefit. (October 15, 1886. Present about seven years.)

LOUISIANA.—*Barataria* (country). William B. Berthoud: I have never known it to destroy insects. I have often killed and dissected them for examination, but never found any insects in them. (June 27, 1887. Present about four years.)

Black Hawk (country). W. C. Percy, jr.: It feeds upon insects during winter and spring, but I do not know upon what kinds. It does not eat the cotton-worm, and I have seen but few insects in its stomach. (September 15, 1886. Present about two years.)

Donaldsonville. L. E. Bentley: I do not know of its destroying any particular insect, injurious or otherwise. Insects remain undisturbed in its very roosting trees. October 3, 1886. Present five years.)

MAINE.—*Brewer.* Manly Hardy: They are said at times to eat canker-worms, but close watching here has failed to see one take any kind of insect. (August 31, 1885. Present about four years.)

North Livermore. George H. Berry: During early spring and summer it eats a few insects, though rarely. It takes the canker-worm, carabid larvæ, *Coccinellidæ* (lady-bugs), and rarely the vaporer moth (*Orgyia*). (August 23, 1886.)

June 3, 1885, I found a nest of the English Sparrow with three young about half grown. In the nest were remains of the *luna* and *cecropia* moths, and *turnus* and *antiopa* butterflies; also a single dead larva of the vaporer moth. June 12, 1886, the English Sparrows (in nest just below my window) hatched and the old birds were feeding them with small green worms. June 14, from 2 to 5 p. m., the Sparrows brought some sixty green worms and a couple of caterpillars of *Orgyia leucostigma* besides flies, moths, etc. July 10, 1887, there being a nest of Sparrows almost ready to fly, in a box, I secured nearly twenty larvæ of *Orgyia* and placed them on a limb just below the nest. For nearly an hour the old birds paid no attention to them, but finally one of them ate one and carried three to the young; the remainder were unmolested. (July 12, 1887. Present about four years.)

Portland. Nathan Clifford Brown: Among 15 Sparrows (14 adults and 1 young) dissected during the four months ending July 18, 1884, only two contained any animal food whatever. One of these contained the remains of a small spider, the other a single leg of a small spider, the remainder of the food in both cases consisting of cracked corn and oats. The food of the 13 remaining birds was made up almost entirely of oats gleaned from horse droppings, two of the birds, one young, having eaten in addition a little green vegetable matter, and all containing some gravel, bits of coal, or brick.

Saccarappa. Arthur H. Norton: It has been observed to feed on red ants and spiders to a small extent. (October 18, 1886.)

MARYLAND.—*Baltimore.* Otto Lugger: Early in the spring when it has young it takes insects. It is very fond of winged *Termites* (have seen them eating them within the past week); it catches flies of the family *Muscidæ*, but takes beneficial species as well as indifferent ones. It destroyed (in 1885) vast numbers of the harmless seventeen-year *Cicada.* (May 10, 1887.)

MASSACHUSETTS.—*Amherst.* Hubert L. Clark: It is worse than useless, taking as it does little or no insect food. (October 2, 1885.)

A few were seen eating canker-worms this year (1886. Present about fourteen years.)

Cambridge. William Brewster: They are emphatically seed eaters. I think they eat very few insects. I do not think it possible that they eat the larvæ of the vaporer moth (*Orgyia*) to any extent, judging by the fact that the Sparrow boxes in Boston are often nearly covered with the cocoons of this insect, and trees crowded with the Sparrows are stripped bare of leaves. * * * I have never made any adequate dissections. Injurious insects, especially the vaporer moth (only in Boston) and canker-worm, have increased rather than lessened since the introduction of the Sparrow. (January 30, 1884.)

Cambridge. Dr. H. A. Hagen: He eats insects in brooding time and *before* this time; in my yard chiefly canker-worms, but before their appearance, eggs and all small insects on the trees, for which he searches the twigs in the manner of the woodpecker. Canker-worms are also carried to the young; I have often seen the male come with five of them in his mouth when there were five young to be provided for. The Sparrow never eats the larvæ of *Orgyia leucostigma.* It is a great but common error here to expect him to eat hairy caterpillars; only a few birds (*e. g.* the cuckoo) eat them. In Cambridge the canker-worm has certainly been materially lessened in numbers by the Sparrow. Since this bird became well established here we have never had such numbers as were common seven or eight years before. (April 13, 1884. Present about eleven years.)

East Templeton. Charles E. Ingalls: It takes insects but rarely, and then while caring for its young. I have seen it upon only two occasions flying to its young in the nest with a white grub which I am unable to name. (August 23, 1886. Present about six years.)

Holyoke. Thomas Chalmers: Sparrows do not take long flights to procure food for their young; if insects are abundant in the neighborhood, insects will be found to form the staple food for the young. When raising their early broods there is no grain or seed to be had, while soft foods, such as insects, larvæ, moths, and grubs are most abundant. (March 6, 1884. Present about fifteen years.)

Lynn. John B. Tolman: I think it scarcely troubles insects. They have increased rapidly since the coming of the Sparrow, and my fruit of all kinds is much more infested than it used to be. (February 15, 1884. Present about eleven years.)

MICHIGAN.—*Bad Axe.* Bell Irwin: I have known it to gorge itself with angleworms, and later on with insects destructive to fruits and vegetables, among them the cabbage-worm. (September 15, 1886. Present about four years.)

Burlington. Postmaster: It feeds upon flies and grasshoppers. (October 21, 1886. Present about three years.)

Grass Lake. Frank O. Hellier: It has been of marked benefit by eating currant-worms, cabbage-worms, etc. (September 7, 1886.)

Hastings. John Bessmer: It has been of marked benefit in the destruction of a great many insects, especially the cabbage-worm and grasshoppers of the smaller kinds. I am satisfied that it feeds its young entirely upon insects. I have watched it day after day and have placed grain food within easy reach, but it would not touch it to feed its young.

In the summer I planted some cauliflowers in my garden and found they were not attacked by the cabbage-worms, and upon investigation I found that the Sparrows were feeding their young upon cabbage-worms picked from the cauliflowers. After the young leave the nest I have seen them feed upon grain and insects together, and when full grown I believe they subsist entirely upon grain. (October 7, 1886. Present about ten years.)

Hudson. A. H. Boies: As an insect-destroyer, I consider it a failure. (1885.)

I once saw a Sparrow catch a single grasshopper, but that is the only instance of its eating insects that I have observed. (August 19, 1886. Present about eleven years.)

Lansing. Jason E. Nichols: I have known it to feed on insects only once, and that was on the harmless flies that swarm over the river. [Probably *Ephemeræ.*] (August 26, 1886. Present several years.)

North Adams. O. C. Smith: From what I have seen, I believe it to be of no value as an insect exterminator; I have yet to observe a single instance in which it has been beneficial. (October 8, 1886. Present five years.)

Saline (country). Norman A. Wood: It feeds upon insects only in case of starvation. We have no bird that eats so few insects. I have never seen it eat worm or larva. (September 6, 1886. Present about six years.)

Traverse City. H. D. Campbell: It feeds upon spiders around dwellings and in other places. (October, 1886. Present about eight years.)

MISSISSIPPI.—*Columbus.* D. C. Hodo: It is the most omnivorous of birds, and when there are no vegetables or grain it eats all kinds of insects and their larvæ. (September 21, 1886. Present about two years.)

NEW HAMPSHIRE.—*Franklin Falls.* George Stolworthy: It is one of our busiest insect-catchers during the breeding season. I have seen it feeding on grasshoppers after the breeding season was over. It destroys potato-bugs, grasshoppers, and many kinds of small beetles and flies. (August 24, 1886. Present six or seven years.)

NEW JERSEY.—*Caldwell.* Marcus S. Crane: I examined the crops of seven Sparrows shot at different times between August 11 and September 12. During this time our grain was stacked, and the elm-leaf beetle was abundant on the elms. In all cases the Sparrows' crops contained grain, and the microscope failed to reveal any remains of insects. (September 20, 1884. Present fourteen years.)

Chatham. George M. Swaim: It eats insects only when driven to it by lack of other food. When they first came to this country I saw them eat soft-bodied, winged insects, but have not seen them do so now for a number of years. (August 31, 1886. Present about eighteen years.)

East Orange. H. B. Bailey: It is a seed-eater, and never touches insects. I have never seen a Sparrow touch a cocoon or worm of the vaporer moth (*Orgyia*), although trees inhabited by Sparrows are often infested by these worms. I dissected sixty adult Sparrows in the height of the insect season, and never found a trace of an insect; nor have I ever seen one touch an insect of any kind. (February 7, 1884. Present ten years or more.)

Orange. Lloyd McKim Garrison: It is a seed-eater. I have dissected many Sparrows, and at all seasons of the year, but have never found a trace of an insect in them, although I think the young eat insects, mainly caterpillars. The canker-worm has been unusually prevalent here of late, but I never saw a Sparrow eat one. (February 11, 1884. Present many years.)

Ridgewood. Henry Hales: In cities I have seen it catch moths of the measure-worm in spring. I have also seen them, when sitting on a fence, fly off one after another and catch flies on the wing like a true flycatcher. (January 18, 1887. Present about fifteen years.)

Trenton. Prof. Austin C. Apgar: It is mainly a seed-eater, but if forced to eat insects will devour any kind. My knowledge is derived from observation only. Injurious insects have apparently neither increased nor decreased since the coming of the Sparrow. (February 25, 1884. Present about fourteen years.)

NEW YORK.—*Baldwinsville.* Rev. W. M. Beauchamp: Twice this year I have seen it catch insects. (October 15, 1885.)

It rarely eats insects. I have occasionally seen it with insects, and have supposed it carried these to its young. (September 13, 1886. Present many years.)

Boonville. Edward Snow: It has been of no benefit except occasionally to catch a few grasshoppers. (August 18, 1883. Present ten or twelve years.)

Brooklyn. W. J. Kenyon: At times I have seen the Sparrows all collect in one spot on the grass and go through what appears to be a war dance. A Sparrow will dart up about four feet, remain fluttering there an instant, and settle again so quickly that there are always two or three birds in the air. I found out later that they were catching small insects something like winged ants. (September 4, 1886. Present thirty years or more.)

[The winged insects referred to were doubtless the so called *white ants* or *Termites*].

Brooklyn. J. A. Perry: The army-worm, which has proved to be so destructive to the grass and grain crops in various parts of the country, suddenly appeared a few days since near the southern boundary of the Greenwood cemetery, a road called Martense's Lane only intervening.

Dreading the ravages which they would commit if they got into Greenwood, orders were given that, in the event of their attempting to cross the road, the entire laboring force of the cemetery should be called out to resist them. Their movements were closely watched, and the mode of attack devised. Spades and shovels were ordered to be used and the great-steam roller of 12 tons weight was to be held in readiness to crush them.

But an army diminutive in individual power, but mighty in numerical force, soon appeared as volunteers in the field, an renddered all other precautions unnecessary. The English Sparrow, which had been encouraged to make its home in Greenwood some years since, in order to prevent the ravages of the inch-worm, which then infested the cities of New York and Brooklyn and which it was feared might reach Greenwood, soon discovered these army-worms, and collecting in some mysterious way from all parts of the cemetery, in a flock numbering several thousands, sped their way to the field, swept around its outskirts apparently to observe the extent of the work before them, landed in the middle of it, and spreading themselves on the right and on the left, proceeded to devour voraciously all the worms which they met. The field being large, some 8 or 10 acres in extent, the attacking hosts were busily occupied nearly three days, but they did not leave except at night, until their work was ended in the complete extermination of the dreaded foe. * * * It is due to this poor defamed bird, in the opinion of the writer, that these facts should be made known, that the opprobium which rests upon it should be removed, and at the same time credit should be given to it for preventing, in one instance at least, the ravages of the much-dreaded army-worm. (For the Journal of Commerce.) (January 24, 1880.)

Brooklyn. Hon. Nicolas Pike: In a very short time [after their introduction in 1852] these voracious little birds completely eradicated the "hanging-worm" or measuring worm, *Ennomos* (*Eugonia*) *subsignaria*, which was threatening our fairest shade trees, and making the sidewalks almost impassable. Now it is difficult to find one in the city. They have also materially lessened the numbers of one of the clear-winged flies so destructive to the grape-vine.

The adult Sparrow eats all the *arachnoidea*, millers, and other small moths and their larvæ, the soft larvæ of almost all insects, and small worms. I have never seen it take either the moth or larva of *Orgyia*, nor have I ever found it in the stomach. It does eat ichneumon flies. The food depends almost entirely on season and temperature. In winter it is found in street droppings, crumbs, or anything obtainable. In summer it lives mostly on animal food, which I believe it prefers, unless persistently fed with grain, bread, etc. The young are fed mostly on spiders and soft larvæ of insects. In the nest I believe they are entirely animal feeders, but out of it they take vegetable and animal food indiscriminately. (February 8, 1884. Present about thirty-two years.)

Buffalo. Prof. Charles Linden: A liveryman tells me that since the advent of the Sparrow he has noticed a gratifying diminution in the number of bot-flies among his horses. The Sparrow loves caterpillars, and insects of all sorts. Our park superintendent, a good, clear-headed observer, testifies in its favor, and ascribes the fine condition of the trees in Buffalo Park largely to this insect-destroying capacity of the Sparrow. I have often seen the Sparrow catching the white cabbage-butterfly, and while chasing a rare *Cicindela* [tiger-beetle] in one of our streets, found a swifter competitor in a Sparrow, which caught the insect on the wing. (1885.)

Buffalo. Dr. W. H. Bergtold: I have repeatedly seen it catch insects in the same way the various flycatchers obtain their food. It also feeds its young almost exclusively on larvæ; at least while they are quite young. (August 21, 1886. Present twelve or fifteen years.)

Constantia. Wallace D. Rhines: It feeds on insects when it can not get grain food. I have seen it destroy quite a number of grasshoppers, but no other insects. (August 23, 1886. Present four or five years.)

Flushing. D. C. Beard: He refuses to eat the hairy caterpillars. The canker-worm has diminished about here, but its place is more than filled by the hairy larvæ. (Present about ten years.)

Gansevoort. Joseph W. Shurter: Possibly when it can get nothing else it may eat insects, but I have examined the crops of perhaps twenty Sparrows at different seasons and invariably found nothing but grain or seeds therein. (February 4, 1883. Present about eight years.)

Lockport. Lewis H. Hill: I have watched them this year on the plum tree, and have seen them open the leaf that had been rolled and eat the worm that it contained. (September 3, 1886.)

New York. Dr. F. Hollick: The Sparrow's consumption of insect eggs in winter is a service which, I think, is overlooked. (September 2, 1884.)

New York. Hon. Robert B. Roosevelt: We must not forget the good the Sparrow has done. When first imported our city trees were annually denuded of every leaf, while the measuring or inch worms hung in festoons in our streets, suspended from the boughs by their webs. They had invaded the smaller parks and threatened soon to destroy all hope of verdure and to kill the struggling trees. * * * Thousands could be counted at one time in Union Square swinging in the breeze and constituting a net-work of repulsiveness. To-day, thanks to the English Sparrow, and to him alone, the measuring-worm hardly exists and never causes perceptible damage. That one good action entitles the author of it to protection. I can not tell you scientifically what insects the Sparrow eats. I can only give you the outcome of my individual experience, and am well aware that most birds destroy the day millers, when it is the night-flyers which are most injurious. But the Sparrow certainly does more good than any other kind—yes, than any dozen kinds we have. (August 8, 1886.)

New York. A. Church: Their favorite food, especially that of the young, consists mostly of ants, worms, flies, and millers, altogether soft food, not grain or seeds. I also notice that the currant bushes in one place are in a thriving condition, owing to the Sparrow's eating the worms which had formerly destroyed the leaves and fruit. The Sparrow is very fond of all such worms, but does not like caterpillars which have hair on them, and these no bird that I know of will eat. On the whole I consider the Sparrow a benefit to the country. (March 27, 1884.)

Old Westbury (country). John D. Hicks: It feeds upon insects in the summer, particularly when it has young, but neither more nor less than the song sparrow and allied birds. When the army-worm was abundant, the Sparrow was one of its most vigilant and persistent destroyers. (September 6, 1886. Present about twenty years.)

Phœnix. Benjamin F. Hess: During the hay-making season I have seen the males capture a great many small insects for the young. It most commonly destroys grasshoppers, but only to a small extent. (August 25, 1886. Present about two years.)

Poughkeepsie. Dr. Alfred Hasbrouck: Occasionally it catches a spider, fly, or some other insect The nature of the food has been determined by observation and by dissection. I have examined many, and have never found an insect. I do not think the effect on insect life is appreciable. (September 9, 1884. Present about twenty years.)

Rochester. H. M. Jennings: It does not feed upon insects under any circumstances.

I have examined many, and found not the least indication of their having taken insect food. (February 12, 1887. Present ten or eleven years.)

Utica. Thomas Birt: It will devour grasshoppers and some kinds of grubs when it can get nothing else. Some three years ago, in the latter part of a summer which had been very hot and dry, I noticed the Sparrows busy in the meadows. Curiosity compelled me to watch them closely, when, to their credit be it said, I saw hundreds of them bringing an equal number of grasshoppers, tearing them to pieces and bolting them down. Hunger must have compelled them to do this, for I am very sure nothing else would. (September 16, 1887.)

Westport. George C. Osborne: When it can not get grain it may eat insects, but I have never found an insect in its crop. (November 5, 1886. Present about ten years.)

OHIO.—*Akron* (suburbs). Prof. E. W. Claypole: In nesting time it feeds its young upon insects; and it picks plant-lice from the trees sometimes. (December 31, 1886. Present about eleven years.)

Avondale. Charles Dury: April 28, 1882, I began an investigation of the food and habits of these birds, being desirous of obtaining correct data in regard to them, and particularly to test their desirability in a general way. In this paper I give a brief summary of the food I found in them. Where the contents of the stomach was not recognizable to the unassisted eye, it was examined under a power of about thirty diameters. The birds secured were both adult and young, though all fully fledged birds and able to fly. No nestlings were obtainable as I did not allow them to nest on the place, which consisted of five acres of ground filled with fruit and other trees. By baiting a spot with oats for several days without molesting the birds, I was able to kill many at a discharge of a No. 12 gun loaded with an ounce of No. 10 shot. One day forty-three were killed in several shots, and of these several selected at random (males, females, and young) were taken to be a fair sample of the entire lot. Others were shot singly from fruit and shade trees, and still others were killed while hopping in the grass.

At intervals as time permitted from April 28, 1882, until January, 1888, I examined about one hundred and ten birds and noted the contents of stomachs. Every month in the year was represented. The food of these birds was seeds of various kinds, grain, oats, broken grains of corn, buds of trees, fruit, and bits of bread and table scraps. I enumerate below the instances where insects were found in any stomach, with the dates.

April 28, 1882. Male; contained seeds, whole and broken, with small round sand and part of shell or outer skin of minute hemipterous insect.

March 2, 1883. Two birds had fragments of small beetles, *Aphodius* (one beetle in each case), in addition to the seeds and grain with which their stomachs were filled.

April 20, 1883. Male and female shot from house top. Male contained, in addition to seeds and buds, one head and part of body of small (*Staphylinid*) beetle.

June 2, 1883. One bird had remains of two small beetles with the broken grains of corn and oats that its stomach was filled with.

June 30, 1884. One bird contained the remains of two small beetles (*Chrysomelids*).

July 5, 1886. In addition to the soft pulp of green oats one bird had the fragments of a large black ant in its stomach.

The above were all the insects I was able to find in any of them. I am astonished at my want of success in finding insects in these birds, as several persons have reported to me instances where they had observed Sparrows catching insects. My observation has been mostly confined to the home place, yet it is a very favorable place for larvæ and insects of all kinds, and before the Sparrows came our native birds were abundant and found plenty of food and shelter in the trees and bushes with which the place was covered. (February 3, 1888.)

Cincinnati. William Hubbell Fisher: He is a seed eater, and I have never seen him take an insect. He will not eat the worms that destroy our trees, though they are most abundant. My data are derived from direct observation. He has had no appreciable effect on insect life here. (September 9, 1884.)

Cincinnati. Dr. F. W. Langdon: I have observed it to be quite expert in catching moths (*Noctuidæ*) on the wing, about our parks; and the seventeen-year cicada furnished an abundant repast during the season just gone. (November, 1885.)

Cleveland. Dr. E. Sterling: As for insects, I have only seen it take the *Ephemeræ* [May flies] and other harmless insects. I have seen twenty or more Sparrows on a fence alive with elm-tree worms, and utterly disregarding these pests. (February 25, 1884. Present about fourteen years.)

Columbus (suburb, Ohio State University). William B. Alwood: I have not observed closely in regard to its relation to insects; but I have never found an insect or any part of one in the stomachs of Sparrows killed and dissected during the harvest season. I have never known it to attack insect larvæ, though many times very abundant. Larvæ of *Hyphantria cunea* (web-worm) were especially abundant during the month of June, just past, but none were eaten by the Sparrows, so far as we could observe. (July 16, 1887. Present ten years or more.)

Hamilton. George Harbron: It feeds upon the measuring worm and cabbage moth to a limited extent. (September 13, 1886. Present about eighteen years.)

Jefferson. A. C. White: I have only observed that it follows robins and bluebirds, and takes from them the worms and insects which they find. (September 3, 1886. Present about seven years.)

Marietta. Dudley S. Ney: They do not seem to destroy caterpillars, grubs, or insect larvæ. I am informed by those who have dissected them that they find no insects in them. (November 25, 1886. Present about sixteen years.)

Newton Falls. E. W. Turner: I have watched them closely, and have never seen one eat an insect yet. (November 16, 1886. Present five years.)

North Bend (suburbs). R. H. Warder: In 1885 it ate the seventeen-year cicada, and in July, 1886, I found them eating grasshoppers in meadows. (November 27, 1886. Present about eleven years.)

Ripley. M. M. Murphy: I find the Sparrow of great benefit in my garden, eating the worms off the cabbages, and the caterpillars, etc., from my persimmon trees. (November 12, 1886. Present about ten years.)

Salem. Mrs. L. S. Solberg: It feeds its young upon insects, and destroys their larvæ. (October 13, 1886. Present seven or eight years.)

Sharon Centre. F. G. Cottingham: It will eat worms, bugs, and beetles when it can not get grain. I have seen it eat locusts, cut-worms, and white grubs, but to a *very* limited extent. The benefit has been very slight. (August 21, 1886. Present about two years.)

Wadsworth. Dr. J. F. Detweiler: I once saw a Sparrow catch and eat a grasshopper, but this is the only instance I have noted of their eating insects. During the summer I dissected a great many to see what they had eaten. I found small grain and seeds in all, but in no single case did I find an insect, nor were any signs of any seen with the microscope. (December 10, 1887. Present about thirteen years.)

Wakeman. W. B. Hall: Last winter I cut an old apple tree badly infested with the scale insect. In trimming the tree I had the brush piled neatly. I soon found the brush pile a resort for the English Sparrows, and by close observation found them picking the scales off. They completely destroyed the scale insects from the above-mentioned tree so that I could not find a single specimen. I looked thoroughly, as I wanted to obtain some for microscopic investigation. This is the only time I have seen the Sparrow eating insects. (December 24, 1886. Present about five years.)

Washington C. H. H. D. Pursell: During the last two years I have been conducting a series of experiments as to the best method of disposing of the English Sparrow, and during that time I have been a close observer of its habits. I am emphatically of opinion that as an insect destroyer he is a failure. (January 23, 1888.)

PENNSYLVANIA.—*Chambersburgh* (country). Davison Greenawalt: I never saw it catch anything but a stray grasshopper or two. (September 5, 1886. Present about fourteen years.)

Lancaster. Dr. S. S. Rathvon. Its benefit to the farmer and horticulturist has been merely nominal. Two or three Sparrows have been occasionally observed in conflict about the possession of a cicada, a locust, or a large larva. Doubtless it feeds its young on soft insects, but I have not noticed a Sparrow destroying an insect in ten years. I once saw two of them contending about the possession of an earthworm.

Although, living in a crowded city, I may not be able to say much specifically as to what insects the English Sparrow destroys, I can bear unqualified testimony as to what it will not or did not destroy. Three or four years ago all the elm trees in this city were seriously infested by the elm-leaf beetle (*Galeruca xanthomelæna*), several large trees being within 100 yards of my business station. There were millions of the insects—larva, pupa, and imago—on the leaves, the branches, the trunks, and on the pavements under the trees, and I visited them often. Midway between my location and these trees was the dead wall of a large three-story house entirely covered by a vigorous "trumpet vine," amid the foliage of which hundreds of Sparrows roosted, nested, and reared their broods, and many of the birds were flying forth and returning, from "early morn to dewy eve," but I never saw one of them visit the infested trees or appropriate a single insect in any of its forms. At the same time I saw scores of them in the streets, picking up whatever they could find, and especially disintegrating and exploring the *fæces* of horses, almost immediately after dropping.

Twenty yards from where I am now daily occupied (on another premise) stands a large cherry tree. Early in the season I noticed a small mass of web, about the size of a common tea-cup, upon a single branch, and I admonished the proprietor to remove it, as it was spun by a species of "web-worm." He paid no attention to it, and now fully one-half the tree is covered and the leaves skeletonized; and this too, notwithstanding not 20 yards distant is the gable of a three-story building covered with another trumpet vine, harboring a colony of an hundred Sparrows or more. They fly straight to and from their rookery, but seldom alight or continue long on the cherry tree.

Again, on my premises is growing a wild cucurbitaceous plant, on which I discovered a small colony of "lady-birds" (*Epilachna borealis*), and as the plant is valueless I permitted them to increase merely to ascertain their destructive possibilities. Although the vine (*Echinocystes lobatus*) is a most vigorous grower, the insects have nearly eaten it up. This vine was also infested by thousands of *Lecanium hemisphæricum* (a species of *Coccidæ*), but the Sparrows did not disturb them. About ten feet from the plant is a large *Wistaria chinensis*, harboring from ten to twenty or more English Sparrows, but they never touched one of the insects to my knowledge, although there has been no period since the 15th of July last that abundance of the larvæ, pupæ, and mature insects were not present. Now, all these insects are of such a texture as to be edible to even young birds, but the Sparrows have "severely let them alone."

Allow me, in conclusion, to say that I have not now, nor have I ever had, any faith in the English Sparrow as essentially a destroyer of insects, simply because it is a *finch.* At the same time I would not wantonly traduce the character of the bird. (October 8, 1886. Present sixteen years or more.)

Mansfield Valley (suburb of Pittsburgh). Dr. R. L. Walker: I notice the Sparrows every morning picking up the moths and other insects which get their wings singed by the natural-gas torch in my garden. This is the only insect-eating I have ever known them to do. When the currant-worm became such a pest I put up a number of boxes for the Sparrows, thinking they would clean out the worms; but the experiment was a failure, for although the boxes were occupied, I never saw a Sparrow touch even a single worm. I tore down the boxes and dug up the currant bushes, and by that means got rid of the worms. I wish I could get rid of the Sparrows as easily. (July, 1887. Present about five years.)

New Lexington. Dr. H. D. Moore: I have examined a great many stomachs, and in only a very few have I found any worms or insects. They eat such of the larvæ of the common house fly as they find in horse and cow manure. I have never observed them searching for insects. (September 13, 1886. Present about eleven years.)

Philadelphia. A. L. Elwyn: Flies, mosquitoes, etc., it eats in great numbers. I have noticed the Sparrows on my pear trees with great care. In the blossoming season they may often be seen plunging their bills deep down into the flowers. I believe they do this to get at some insect or worm, and am satisfied that the trees were preserved and bore largely through these little birds. (October 11, 1885.)

Pottstown. John H. Steele: I have very seldom seen it eat insects. In a very few instances I have known it to take grubs of moths and butterflies, when it could find no fruit. (August 19, 1886. Present about sixteen years.)

South Bethlehem. Robert W. Barrell: I have seen it destroy the seventeen-year locust to quite a large extent, but never saw it feed on any other insect. (September 16, 1885.)

West Chester. Dr. B. H. Warren: He is emphatically a seed-eater. In the case of one hundred dissections, vegetable material was greatly in excess of insects as a matter of diet. Out of fifty dissections made during March, April, May, and June, forty-seven showed cereal and vegetable food, while one stomach contained a single coleopterous insect. (January, 1887.)

RHODE ISLAND.—*Hill's Grove.* Fred T. Jencks: I have seen it feeding upon canker-worms, though very seldom. (November 6, 1886.)

Newport. Charles H. Lawton and John J. Peckham: It feeds upon insects, spiders, and tree lice to some extent. (November 4, 1886. Present about eleven years.)

Peace Dale. R. G. Hazzard, second: The bird is omnivorous, but feeds its young chiefly on insect larvæ. (May 26, 1884. Present about twenty-six years.)

Westerly (suburb). B. F. Maxon: After oats are harvested it feeds some on young grasshoppers. (March, 1887. Present about thirteen years.)

SOUTH CAROLINA.—*Charleston.* Dr. G. E. Manigault: It eats both seeds and insects (flies and grasshoppers), but feeds its young chiefly on the grain from horse droppings. (August 24, 1884.)

James Island. W. I. Hinson: We expected great benefits from its attacks on the cotton worm, but it does not seem to disturb it. It does not feed upon insects, except on the caterpillars on trees around buildings. (November 2, 1886. Present four years.)

TENNESSEE.—*Lawrenceburgh.* W. T. Nixon: I have observed the old birds feeding their young on white grubs which proved to be maggots from a dead animal. (February 21, 1887. Present about two years.)

UTAH.—*Provo City.* Jas. G. Kenney: It was expected that it would be destructive to the codling moth, but it is not. (November 15, 1886. Present about six years.)

VERMONT.—*Lunenbugh.* Dr. Hiram A. Cutting: It feeds upon both seeds and insects, eating the cabbage-worm and the larvæ of various flies. It feeds its young on cabbage-worms and other insect larvæ, and on seeds. It has taken all the cabbage-worms from my cabbage field. The bots in horses have become almost unknown, and it is the prevailing opinion that the Sparrow eats the larvæ as they come from the horses. (August 19, 1884. Present four years.)

Saint Johnsbury. Rev. Henry Fairbanks: It is chiefly a seed-eater. I have watched it a great deal without seeing it take insects. (February 5, 1884. Present eight or ten years.)

West Pawlet. Dr. Frank H. Braymer: It is a seed-eater, and I think it eats very few insects, worms, etc. It eats a few small green worms and small grasshoppers, and carries them to its young. (February 15, 1884. Present nine or ten years.)

VIRGINIA.—*New Market.* George M. Neese: Last summer the Sparrows went in large flocks to the fields and destroyed a great many of the grasshoppers that were here in millions devastating every green thing that lay in their path. (December 30, 1885. Present about eleven years.)

Richmond. Col. Randolph Harrison: My belief is that they do not consume insects to any great extent, though they may destroy larvæ. I have seen caterpillars in elm trees in vast numbers, and the Sparrows, as I believe, did not touch them. I saw one with a live butterfly in his mouth—the only instance of its insect-eating I have known. (August 20, 1886.)

WEST VIRGINIA.—*Buckhannon.* Dr. J. R. Mathers: It has been of marked benefit in destroying the eggs of the tent caterpillar and eating the green cabbage-worm. (August 19, 1886. Present about five years.)

Hickory. J. H. Shank: I have recently learned that they are very destructive to the cabbage-worm, the larva of *Pieris rapæ.* (November 22, 1886.)

Leon. G. W. Knapp: The Sparrow does not eat caterpillars, for there have been some on my grape-vines and pear trees not 20 yards from Sparrows' nests. (September 21, 1887.)

WISCONSIN.—*Milwaukee.* Walter B. Hull: It feeds upon insects when no grain is to be had. I have seen it feed on grasshoppers, but not often, and can not say what insects it eats. It seldom eats animal food. (August 23, 1886. Present about six years.)

Milwaukee. Charles Keeler: It generally feeds upon caterpillars when they are plenty. It destroys canker-worms somewhat, but before the Sparrow was introduced no complaints were made about canker-worms. Spiders are also eaten. (August 21, 1886. Present about fifteen years.)

Stoughton. Z. L. Welman: It has been of marked benefit in the destruction of grasshoppers and the like, and has been seen feeding upon a species of katydid when this insect was abundant in the shade trees. (December, 1886. Present about ten years.)

CANADA. ONTARIO.—*Belleville.* Prof. James T. Bell: It benefits the farmer and horticulturist a little by eating insects. I have noticed it feeding its young with small green caterpillars on the apple trees behind my house. It eats the insects it finds on the streets. I have noticed it feeding on *Harpalus ragans* and other *Carabidæ*, catching ichenumon flies and lace wings on the wing, and attempting to catch butterflies. August 17, 1886.)

In justice to the little rascal I must state that Mr. Richard Elvins, a rather extensive market gardener of this city, informs me that some four years ago his cabbages were badly infested with the caterpillars of the white cabbage butterfly, and he was afraid that he should lose the larger part of his crop. One day, however, a company of Sparrows swooped down upon the plants and cleared the insects completely off them, so that he cut a remunerative crop in due season. (September 2, 1886.)

Belleville. William N. Ponton: As regards insects, I assert most postively that when the Sparrow can get grain it will not touch anything else. (September 27, 1884.)

Hamilton. Thomas McIlwraith: I have seen them take moths, caterpillars, and spiders, and they also feed their young on them. (March 10, 1884. Present about ten years.)

Listowel. William L. Kells: We have seen it catching crickets, grasshoppers, and May bugs, and carrying green caterpillars to its young. (June 23, 1884, and August 23, 1886.)

Ottawa. H. B. Small: I have seen it carrying the codling moth to its young and it also takes them worms and grubs. (May 5, 1884. Present about fourteen years.)

Ottawa. W. L. Scott: I dissected a young Sparrow in August and found him simply gorged with grasshoppers. Large flocks of these birds, principally young ones, leave the town for the country in the early autumn, and I have no doubt they feed largely on grasshoppers. The decrease of this insect, which used to be a terrible pest on the Government Square and other lawns about the city, but which during the last few years has almost entirely disappeared, has been attributed, and probably with some truth, to the increasing abundance of the Sparrows. I have seen the Sparrows chase the cabbage butterfly in a most determined manner, though I am not sure I have ever seen them catch any of them. (January 26, 1886.)

Strathroy. L. H. Smith: I have watched old birds for hours carrying grasshoppers to their young ones. These are the only insects I can name, but I have seen them hunting for insects on my lawn, but do not know what kinds. (October 4, 1886. Present about twelve years.)

Toronto. Dr. William Brodie: With us the Sparrows, in the fall season any way, feed largely on grasshoppers. Of forty-three specimens, shot outside city limits, between August 20 and September 13, 1886, the gizzards of twenty-seven contained grasshoppers, *Caloptenus femur-rubrum*, and *Œdipoda carolina*, which is surely a very good record for the Sparrow. (November 15, 1887.)

[See also Dr. Brodie's reports on the food of the Sparrow, pages 311–314, 327–329, of this Bulletin.]

NOVA SCOTIA.—*Kentville* I was told by Mr. Elihu Woodworth, now of Sackville, New Brunswick, formerly of Kentville, Nova Scotia, that when the Sparrow first appeared in Kentville, in 1881, canker-worms were abundant and everywhere increasing, and the Sparrows never rested until they had utterly exterminated them. (T. A. H. Mason, Sackville, New Brunswick. August 24, 1886.)

Two Rivers. B. B. Barnhill: It feeds on insects from the leaves of trees, and destroys the little green worm such as is seen on currant and gooseberry bushes. (August 20, 1886.)

SECTION SECOND—PUBLISHED TESTIMONY.

OUTLINE OF THE HISTORY OF THE SPARROW QUESTION.

The preparation of a list of books and lesser publications relating to the Sparrow does not fall within the province of the present Bulletin, but it may be well briefly to outline the history of the "Sparrow question" in other countries as well as in America.

The history of the Sparrow begins with the history of man, and there is every reason to believe that this bird was well known to people of whom we have no written history; certainly frequent mention of it is made in the histories of the earliest civilizations of Europe. The Sparrow is mentioned repeatedly by Aristotle, and by almost every European writer on natural history who succeeded him.

At a meeting of the Boston Society of Natural History, held April 17, 1867, Dr. Charles Pickering called attention to the recent introduction into the United States of the House Sparrow of Europe, stating that as it threatened great evil preventive measures should be speedily adopted. The official report of this meeting contains the following:

> Proofs of its destructive habits were cited from standard authors, showing that the bird had been the acknowledged enemy of mankind for more than five thousand years. When writing was invented the Sparrow was selected for the hieroglyphic character signifying enemy.
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> Sonnini, in the Dictionaire d'Histoire Naturelle, published in 1817, says:
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> "Sparrows are impudent parasites, living only in society with man, and dividing with him his grain, his fruit, and his home; they attack the first fruit that ripens, the

> grain as it approaches maturity, and even that which has been stored in granaries. Some writers have wrongly supposed that the insects destroyed by them compensated for their ravages on grain. Eighty-two grains of wheat were counted in the craw of a Sparrow shot by the writer, and Rougier de la Bergerie, to whom we owe excellent memoirs on rural economy, estimates that the Sparrows of France consume annually 10,000,000 bushels of wheat."
>
> Valmont de Bomare, in his dictionary, published in 1791, says that "in Brandebourg, Prussia, in order to diminish the ravages committed by Sparrows, a price is set on their heads, and the peasants are compelled by law to bring in a certain number yearly. In each village there are Sparrow hunters, who sell the birds to the peasants to enable them to pay their tribute." (Proc. Bost. Soc. Nat. Hist., XI, 1867, pp. 157, 158.)

For more than four centuries the character of the House Sparrow has been discussed in France, Germany, and Great Britain, and from time to time, especially during the last hundred years, official investigations of greater or less magnitude have been undertaken by different states or provinces, in the hope of settling the question. Among such efforts in Europe may be mentioned the commission appointed by the Senate of France, which, under the direction of M. Florent Prévost, finished its work in 1861; the Commission on Wild Birds Protection, appointed by the British Parliament in 1873; more recently (1885), the work of Mr. J. H. Gurney, jr., and Col. Champion Russell, entitled The House Sparrow; and the ninth annual report (1885) on Injurious Insects and Common Farm Pests, by Miss Eleanor A. Ormerod, consulting entomologist to the Royal Agricultural Society of England. Extracts from some of these works will be found in the following pages.

The lesser publications on the Sparrow question in Europe are too numerous to mention, but, unfortunately, as Prof. Alfred Newton remarks in the last edition of the Encyclopedia Britannica (art. *Sparrow*),

> No definite result that a fair judge can accept has yet been reached. * * * Both friends and foes of the Sparrow write as violent partisans, and the truth will not be known until a series of experiments, conducted by scientifically-trained investigators, has been instituted, which, to the shame of numerous agricultural and horticultural societies, has not yet been done.

In other parts of the Old World much damage has been done by sparrows, but frequently other species than the English Sparrow have been concerned. Thus in Algeria immense injury to grain crops has been done by sparrows, but the species doing the most harm, if not all of it, is undoubtedly the Spanish sparrow (*Passer hispaniolensis*), a near relative of the House Sparrow, but a bird which avoids human habitations and nests in large communities in groves, thickets, sedges, and beds of tall reeds and grass. The ravages of this species, a detailed account of which appeared in the French Bulletin de la Société d'Acclimatation (Vol. III, 1876, pp. 460–463, and Vol. IV, 1877, p. 62), have been attributed by American writers to the House Sparrow, but there is no evidence that the latter bird had any part in the mischief, although it is known to exist in some of the cities and towns of Algeria.

In Australia and New Zealand, however, the English Sparrow, originally introduced from Europe, has been of late a source of constant anxiety and apprehension. For the last decade or more the newspapers have been filled with complaints of injury and petitions for restrictive legislation, but no important works on the subject have been published. One of the latest contributions to the history of the bird in Australia is the Draft Progress Report of the Board of Investigation, appointed by the governor of South Australia in 1881, which has been quoted nearly entire in the following section of this Bulletin. (See page 348.)

In America the condition of affairs has been similar, except that no official commissions have been appointed to investigate the subject, and most of the published material on the Sparrow belongs to what may be called fugitive literature. Only two works devoted entirely to the Sparrow have been published in the United States, one in 1878, by T. G. Gentry, entitled *The House Sparrow at Home and Abroad;* the other in 1879 by Dr. Elliot Coues, entitled *On the Present Status of Passer domesticus in America, with Special Reference to the Western States and Territories.* Both these works contain lists of papers relating to the subject, the bulletin by Dr. Coues consisting almost entirely of such a list, covering the period from 1867 to 1879, and giving the titles of one hundred and ninety papers, mainly from newspapers and other periodicals.

Dr. Pickering's warning against the Sparrow, uttered in 1867, has been alluded to already; but, although the first, this was not the only expression of apprehension. In a paper published in the American Naturalist for August, 1872, Mr. H. J. Bruce describes the habits of the Indian House Sparrow (*Passer indicus*), and after stating that Dr. Jerdon pronounces this bird one of the greatest pests of India, alludes to the introduction into the United States of the nearly allied European House Sparrow (*P. domesticus*) in the following words:

> I confess that I look with some apprehension upon these efforts, which I believe to be ill-advised and inexpedient. The European House Sparrow does not differ essentially in its habits from its Indian ally, and, so far as I can learn, it is very generally regarded as a nuisance wherever it abounds. In some parts of England a bounty is placed upon its head, and considerable sums of money are paid for its destruction.
>
> * * * * * * *
>
> If the Sparrow is to be introduced into America to devour the larvæ of insects, it should be remembered that it is for the most part a feeder on grain, seeds, and buds, and that it only makes a business of devouring grubs during its breeding season. * * * I trust that those who have to do in this matter will act advisedly, lest they should introduce that which will eventually become as great a nuisance in its way as the curculio and the canker-worm. (American Naturalist, VI, 1872, pp. 468–470.)

In 1874 Dr. T. M. Brewer, of Boston, Mass., took up arms in defense of the Sparrow by replying to an article by Dr. Coues in the *American Naturalist*, reflecting on the bird, and during the four or five years following a lively controversy was carried on in this journal and the newspapers, by these two naturalists, re-enforced from time to time by various others.

In 1878 the Nuttall Ornithological Club, of Cambridge, Mass., devoted one of its meetings to the consideration of the Sparrow question, and the conclusions, which were widely published in the newspapers, led to still further discussion.

Meanwhile the farmers of the country were becoming interested in the matter; numerous articles of more or less value appeared in the agricultural press, and occasional essays and installments of evidence of more than usual value were presented before scientific societies and published in their proceedings.

Finally, in September, 1883, a committee was appointed by the American Ornithologists' Union to investigate the charges against the Sparrow. A circular was prepared and distributed, and much valuable information was collected. A report based on this information was submitted to the council of the American Ornithologists' Union at a meeting held in Washington, D. C., April 21, 1885, and was afterward published in *Forest and Stream* (XXV, August 6, 1885, pp. 24, 25), and is now reprinted in this Bulletin (page 315).

Subsequently, all the evidence collected by the committee of the Ornithologists' Union was turned over to the Department of Agriculture, as already stated, and has been used in the preparation of the present Bulletin.

TESTIMONY RELATING MAINLY TO THE SPARROW IN AMERICA.

[American Naturalist, Vol. XV, pp. 392, 393.]

THE ENGLISH SPARROW IN ILLINOIS.

* * * The thorough examination of the food and food habits of the English Sparrow, which is certain to result from the intense and universal interest the little stranger has awakened, will give us a mass of valuable facts for comparison with those accumulated in Europe, where the debate concerning the good and evil of its life has been vigorous and long-continued. We shall thus be able to trace much more fully and exactly than has ever yet been done the effects of widely changed conditions upon the alimentary regimen of a bird.

Now that the stage of more or less ignorant and passionate discussions and personal vituperation seems nearly to have passed, contributions of fact will probably not be unwelcome. I add a few notes on the food of twenty-five birds shot in and around Aurora, Ill., in September of two successive years, 1879 and 1880.

The elements of the food at this time were quite few and simple, consisting almost wholly of fragments of grain picked up on the streets and of the seeds of a few of the commonest grasses. At a time when 30 per cent. of the food of the robin, 20 per cent. of that of the catbird, and 90 per cent. of that of the bluebird consisted of insects, no insects were found in the stomachs of these birds, except traces of three grasshoppers, making perhaps 6 per cent. of the food. Fragments of corn, wheat, and oats amounted to about 40 per cent., and the seeds of grasses to as much more. The common pigeon grass (*Setaria viridis*) was much the most abundant species; but *S. glauca* and *Panicum sanguineum* occurred quite frequently, and three or four species of *Panicum* and *Eragrostis*, which I did not determine, were also present in small quantity. One bird had eaten many hemp seeds, five had taken a very few seeds of "smartweed" (*Polygonum*), and two had eaten little else than the seeds of the common garden sunflower. (S. A. Forbes, Normal, Ill.)

[American Naturalist, Vol. XVI, p. 1009, December, 1882.]

HABITS OF THE ENGLISH SPARROW.

The following interesting note has been received from Dr. A. K. Fisher, of Sing Sing, N. Y.:

"Knowing your great fondness for *Passer domesticus*, I send you a brief account of one of the various ways in which he imposes upon his superiors. The following was related to me by a friend, who was an eye-witness:

"'You well know that when robins are feeding their young they will often collect a number of worms, forming a large billful, before making a trip to the nest. Well, the Sparrow noticed this, too, and when the robin would alight to pick up something more, he would dash down beside the robin and snatch whatever might be in his mouth, then fly a few feet off. The robin would hop after him, when he would make another short flight until the robin would give up and go and hunt for something more.'

"My friend saw the Sparrow do this five or six times one afternoon." (Elliott Coues, Washington, D. C.)

[Science, Vol. VII, p. 80, January 22, 1886.]

THE ENGLISH SPARROW.

A European ornithological journal recently contained the following testimony in regard to the Sparrow (*Pyrgita domestica*), from the pen of Dr. Schleh, professor of agriculture at the college of agriculture, Herford, Germany. Dr. Schleh has paid a great deal of attention to this matter, and believes the Sparrow a pest on the Continent, voluminous evidence of which he is said to have brought forward in his small treatise entitled "*Der Nutze und Schaden des Sperlings* (*P. domesticus*) *im Haushalte der Natur*."

By examining the crops of a great number of nestling Sparrows sent to him from different parts of the country, he found that young Sparrows, while in the nest and for a week after having left it, subsist entirely on insects, grubs, etc. Two weeks after leaving the nest their food still consists of 43 per cent. of animal food; a week later of 31 per cent., and after that age of only 19 per cent. of animal ingredients. But as soon as they become independent of their parents they prefer seeds, and subsist almost entirely on grain, fruit, and the buds of trees. Dr. Schleh, however, mentions some interesting instances regarding some specimens which seemed to have a peculiar taste for the seeds of weeds which often become a great plague to the agriculturist. In one crop he found the considerable number of three hundred and twenty-one whole seeds of *Stellaria media* (Vill.), in another forty-three seeds of *Atriplex patulum* (L.), in a third sixty-six seeds of *Setaria verticillata*. Some individuals also have a special liking for certain insects. Thus he found in one crop ninety specimens of *Haltica affinis* (Gyll.), four other Sparrows had eaten almost nothing else but a certain kind of beetle, *Anisoplia fructicola* (F.). (Ernest Ingersoll.)

[Forest and Stream, Vol. VIII, p. 165.]

As an encouragement to importers of birds, I claim to have imported Sparrows into America at Portland, Me., in 1854, and I had to import them three times at Quebec before they took root. The two first importations were secret. To the latter I gave the utmost publicity, and the last course was the successful one. * * * I imagine no live Yankee would wish to be now without the life and animation of the House Sparrow in his great cities. They are like gas in a town—a sign of progress. I admit the bird is a little blackguard—fond of low society and full of fight, stealing, and love-making—but he is death on insects, fond of citizen life, and in every way suitable to be an inhabitant of the New World. * * * (W. Rhodes, Quebec, Canada, April 7, 1877.)

[Forest and Stream, Vol. X, p. 196. April, 1878.]

In regard to the Sparrow's destroying insects and larvæ, I am surprised that any one claiming to be a student of ornithology should deny that the English House Sparrow feeds on insects and caterpillars. Especially in the breeding season insects are its principal food, and when it has young almost any caterpillar is greedily sought after, except those thickly covered with hair. Spiders they are very fond of, and, during the last few warm days, every nook and corner has been explored in search of them around my two-story work shop. In a large *Ailanthus* tree in my yard I have a number of boxes, each having a tenant. I therefore have a large number constantly under my observation. Many species of *Lepidoptera* formerly plentiful in Brooklyn have very nearly disappeared, among these the one which feeds on the *Ailanthus*, and which nearly destroyed the foliage of that fine shade tree, has been nearly exterminated by the Sparrow. I believe the Sparrow to be a very useful little bird, and I should be very sorry to see him destroyed. I am now speaking only of the city. If it should become very abundant in the country it may do some damage to the grain crops, but that is the only harm it will do. In regard to its driving away native birds from the city, we never had any remain in it, excepting a few chipping sparrows, martins, and swallows, and these are all as plentiful now as ever. A chippy built its nest last summer in my tree, within two feet of a Sparrow house. (John Akhurst.)

[Forest and Stream, Vol. XII, page 424.]

* * * I am no friend of the noisy, dirty pests they [the Sparrows] have become in our city, but give my evidence in order to show that, probably from local habit, they do eat insects here. We have a grasshopper, quite common during the summer, frequenting open places in fields, roads, and streets, fully two inches in length, of a dirty brown color, and when at rest unattractive-looking, but having the under wings a rich black, bordered with a wide margin of bright yellow, very conspicuous when flying. * * * This hopper has a habit of every once in awhile rising on wing three or four feet from the ground and then remaining nearly at one place (precisely like a hawk when hovering on the lookout for dinner) for a moment or more, making a peculiar cracking noise at the same time, and then alighting again near the place it started from, where generally there is a female to be found, if searched for. They are common in the heart of the city as well as country, and I have time and again, when watching this "hovering," seen a Sparrow dart from a neighboring tree or house, grab the hopper, sometimes missing it at first, but following it in its flight, and finally catching it.

We are very much troubled in our house with the small "croton bug," and also the large black roach. Their increase is enormous in our climate, and it requires constant war to keep them down. My kitchen opens on the back yard, without step. Under my hydrant there is a bucket of water always standing with running water for the dogs. This bucket is the central bathing and watering place for the Sparrows from, judging from their numbers, a very large circle around. Once a month or more I am in the habit of thoroughly blowing a full quantity of the commercial insect powder in all cracks and crevices of kitchen, basement, outhouses, etc., to catch the young brood of roaches and rout out the new settlers. The croton bugs easily give up, but the large black roach, with his heavy mail, dies hard, and, though in the end surely dies, will run for an hour after being well dosed before doing so. A great many of these roaches run out the kitchen door into the yard, and the Sparrows seeing them at once go for them. There is always one or more around the bucket, and the first roach is the signal for them to get together, and they clean out the last one, even going into the kitchen after them. They grab one, fly to a neighboring shed or wall, beat it to death, and either fly off with it or eat it on the spot. This is a regular occurrence whenever I rout out the roaches. * * * (Russell Robinson, Richmond, Va., May 27, 1879.)

[Forest and Stream, Vol. XXVIII, p. 513, July 7, 1887.]

Two instances have lately come to my notice illustrating the vicious character of the imported Sparrow, and, as I think reports of such cases tend to harden the hearts of the people against the bird, I consider it desirable that they should go on the record.

My attention was called one morning to the excited actions and notes of a pair of white-breasted swallows, which were rearing a brood in a box near my door. Looking at the box I saw a male English Sparrow at the entrance alternately thrusting his head inside and facing around to ward off the assaults of the swallows. Suspecting mischief, I shot the Sparrow, and my suspicions were confirmed. His bill, covered with blood and down, proved that he was deliberately murdering the young swallows.

The other case is similar. Dr. Adams, of this place, reports as follows: One morning he observed English Sparrows apparently occupying a box in which he knew swallows were nesting. Investigating, he found in the nest the body of the mother swallow, with the fresh wounds on the head from the Sparrow's bill.

Now, this is simply atrocious. I would like to have some friend of this bird—and I understand there are yet a very few such—set forth a single item in his favor to offset the huge pile of indictments against this filthy, noisy, quarrelsome, and bloodthirsty foreigner. Something must be done. How long are we to stand with our hands behind us, saying, "Too bad! too bad!" Probably until it is too late, if, indeed, it is not so already. It should be "war to the knife!" (F. C. Browne. Framingham, Mass., June 25.)

[Forest and Stream, Vol. XXIX, p. 86.]

In a paper read before the California Academy of Sciences August 1, 1887, Mr. Walter E. Bryant says of the Sparrow:

"Since the introduction of this pest into our cities, many birds, hitherto common, have left for the suburbs, notably the cliff swallows, whose nests were appropriated by the Sparrows. In these cases the limited space compelled the latter to dispense with the usual amount of rubbish and carry in only a lining of feathers."

[Forest and Stream, Vol. XXIX, p. 105.]

Ned W. Goodwin, of Sharpsville, Pa., says:

"I have this season seen, in a fir tree near a residence about two miles out of town, six nests of the English Sparrow. The branches of the tree, radiating from the trunk in series quite closely disposed one above another, droop downward, and, thickly fringed with long sprays of foliage as they are, afford the nests ample shelter from the weather. Each of the nests in question was situated upon the drooping portion of a branch and upon the convex upper surface of the leafage of the branch. The bird had made first a foundation mat of straw, on which it built up a structure nearly spherical in form and about one foot in its greatest diameter, of straws quite neatly woven together. Inside this ball is the nest proper, which is thickly lined with the downy feathers of barn-yard fowls. The entrance to the nest is an ascending cylindrical tunnel, lying along and directly above the supporting branch. One of the nests is on a branch the extremity of which is not more than seven feet above the ground. Drawing this branch downward I closely examined the nest. It contained six eggs. One nest was situated about 25 feet above the ground, the others lower down. The tree affords good shelter at a height considerably greater than 25 feet."

[Forest and Stream, Vol. XXIX, p. 164, September 22, 1887.]

SPARROWS DRIVEN OUT BY WORMS.

Until two or three days since a brood of English Sparrows have had their roosting place in a Virginia creeper just outside the window of a room where I am writing.

This year the web caterpillars have been unusually abundant in the neighborhood of Sing Sing. They are found crawling everywhere in the village. After they had stripped a mulberry tree that grows at the end of the piazza, they seized upon this Virginia creeper. A number of them are now denuding it, and at length have disclosed the covered angle of the chimney where the Sparrows had their cosy roosts. Such behavior on the part of the caterpillars has been too much for the Sparrows. They have had to give way and move off. This time the Sparrows have been driven out by the worms.—A. H. G. [Rev. A. H. Gesner], Sing Sing, N. Y.

[Forest and Stream, Vol. XXX, pp. 204–205, April 5, 1888.]

NOTES ON THE ENGLISH SPARROW, PASSER DOMESTICUS.

By Ernest E. Thompson, *of Toronto, Canada.*

The marvelous rapidity with which the English Sparrow has multiplied and is multiplying on this continent, its evident capability of spreading still farther, and the probability of its eventually occupying the whole of agricultural America to the exclusion of many beneficial species of native birds, combined with the reiterated and increasing clamor of complaints against the species, have at length induced several of the State Departments of Agriculture in America, first, to accept the fact that this bird is a tremendous power in the agricultural economy of the country; second, to follow with the question, is it a power for good or for evil?

It is worthy of notice that there are still many persons who deny that the Sparrow can ever make its influence felt in this country in any economic direction. For the benefit of these I will briefly refer to the depredations of the species in England, where not only the cities but also the villages and barn-yards are populous with Sparrows; and in the south of England the farmers are compelled to expend considerable sums annually to keep down the hordes of these marauders, for the experience of centuries has taught the farmer that the Sparrow is an unmitigated nuisance. I myself have seen acres and acres of grain fields in southern England that have been so thoroughly devastated by Sparrows that they were not worth the cutting. All investigations that have ever been conducted in England have, so far as I can learn, resulted in a verdict most unequivocally damnatory of the Sparrow; and yet, in the face of this, private persons and corporations, swayed not by facts, but by the same foolish sentiment which prompted the introduction of the Scottish thistle to Van Dieman's Land, have introduced and encouraged this pest in this the greatest of agricultural countries. What wonder that the English farmer stared in blank amazement when first he heard of it, or that he failed to account for the action except on the assumption that America had been visited by a wave of temporary insanity.

It has been often argued that, so far as we Canadians are concerned, the Sparrow can never give us much trouble, as the climatic and other conditions are sufficient to prevent its increasing to the same extent as in England. But unfortunately the facts are sufficient to entirely dispel this illusion. The first time that I saw the Sparrow in Toronto was, I think, in 1874, when a single pair was observed. Since then it has gone on increasing until now the natural sources of maintenance are taxed to the utmost, and each successive brood as it attains maturity is compelled to migrate to some distant locality where the struggle for life is less severe. This process of multiplication and migration has gone on yearly, each of our large cities being centers of supply, until now every town and nearly every village in Ontario is thoroughly stocked with Sparrows, and when this occupation is complete they will unquestionably spread over the intervening farm lands.

The severity of the winter was confidently pointed out as an efficient check, but there is every evidence to prove that the Sparrow can live as far northward as wheat can be grown with success. At Bracebridge and Gravenhurst the species has long been established, and at North Bay, Lake Nipissing, which I visited in January, 1887, I found the English Sparrow in full force and possession.

In response to a request for information Mr. John Bourk sends the following interesting note:

"From all I can learn the English Sparrow came here (North Bay) during the winter of 1885–'86. I think the first of them came in grain cars from the east. The first I noticed were in a car at the station, and only two of them. They must have bred here, as they are increasing or have increased during the past summer. There has been a flock of about one hundred around our yard all winter, and, as you know, it has been extremely cold. I missed them for about two weeks in the latter part of February, but they returned the first part of March. They lived on hay-seeds and pickings from manure piles during the winter. I have not noticed what they live on in the summer, nor where they nest. They are at Mattawa, and very numerous at Pembroke. They have been at the later place, I think, for five years. I have never known them to die from cold. They seem to be as hardy as the snow-bird."

This, together with the facts that the Sparrow is each year occupying more exclusively the regions between the centers and the advance posts, and that it is dispossessing our native birds, should leave no doubt in any candid mind that ultimately agricultural Canada will be as completely overrun by the English Sparrow as is agricultural England at the present time; for if the other birds of England, which have been subjected to the same long severe process of specialization are unable to hold their own against the invader, much less can our native species, which have been but recently brought into contact with civilization and its attendant hardships.

Since none but actual personal observations are desired in this connection, I pass over a multitude of hearsay cases, and state what I have seen of the Sparrow's encroachments.

The only native species which I myself have seen dispossessed by the invader are the pewee (*Sayornis phœbe*), chipping sparrow (*Spizella socialis*), white-breasted swallow (*Tachycineta bicolor*), house wren (*Troglodytes aëdon*), robin (*Merula migratoria*), and bluebird (*Sialia sialis*). The aggression has never, so far as I have seen, taken the form of actual onslaught, except in the case of a pair of white-breasted swallows, which were forcibly dispossessed of their completed nest in a pole-house. More usually the native bird is merely "crowded out" through its inability to compete with the more highly specialized Sparrow in the struggle for existence. On the other hand, although several native species of predatory birds (as falcons, hawks, shrikes, etc.), are reported as preying on the Sparrow, I have never seen any but the pigeon falcon (*Falco columbarius*) and the sparrow-hawk (*F. sparverius*) actually engaged in the work of destruction, and as these birds seldom enter or live about the large towns, their influence as a check is at present but trifling.

From a fuller working out of the lines of argument sketched, if not from the facts herein stated, I think that it will be admitted that the species under consideration will very soon make itself felt as an economic power in the country if it has not already done so. It then lies with us to decide, Is it a power for good or for ill? Is it boon or bane?

Passing over the unanimous and strongly adverse verdict of the agricultural interest in Britain and in other European countries, and the overwhelming body of condemnatory evidence of our own market gardeners and fruit growers, as well as naturalists, I will add my own observations.

First. We have abundant and conclusive evidence that our own birds, as a whole, are eminently beneficial to agriculture, and we have further proof that these birds are retreating before the Sparrow, which of itself should be sufficient to condemn the invader, unless it can be shown that it is even more beneficial than the native birds.

Second. But on the contrary, as above stated, in England, where the species has already attained the position it is rapidly approaching in Ontario, the havoc it makes in the grain fields is something past belief, and in the aggregate constitutes a heavy tax on the already hard-pressed farmers of that country.

From my own observation the Sparrow is pre-eminently a grain eater, though, as will be seen from the appended tabular statement, it varies its diet in the spring-time with buds, in the early summer with insects,—some of them noxious—and in the late summer with fruit and grasshoppers. The taste for grasshoppers, however, seems to be almost, if not wholly, confined to the young fledgelings. When in the nest they are fed, I believe, entirely on insect food, so that after having flown they continue to subsist on the same for a time, ultimately becoming as granivorous as their parents.

The following list of gizzard contents is, on the whole, the most favorable to the species of any I have seen ; this may be accounted for by the fact that all the birds were shot in the suburbs of Toronto, in localities at considerable distances from any grain fields, so that a miscellaneous and consequently a creditable diet was inevitable. For the identification of the gizzard contents throughout and for other assistance I am indebted to the kindness of Dr. William Brodie, of Toronto.

I affix also an estimate made by the above gentleman of the economic value of the gizzard dissections. It is understood that ten points are allowed for each, and when the dissection presented neither good nor bad features it was entered as five on each side. Whenever the grain found had evidently been taken from manure it was entered as a good feature, for no harm was done, and viewed as a scavenger the bird was beneficial. The fact, however, that the question of appetite alone is on trial may make many, like myself, dissent from such a valuation. In many other particulars my opinions differ from those of my friend, but I make no alterations, as he alone is responsible for the two columns of "points,'

Date.	Sex.	Contents of gizzard.	Points.		Remarks.
			For.	Against.	
Mar. 24, 1884	....	Flock of a dozen devouring buds of the soft maple	4	6	Not actually dissected, but carefully watched.—W. B.
Mar. 25, 1884	....	Flock engaged as above	4	6	Same remark applies.
Apr. 7, 1884	....	Flock engaged as above	4	6	Same remark applies.
Apr. 8, 1887	♂ ad..	Unrecognizable mass of vegetable matter	5	5	
Apr. 8, 1887	♀ ad..	Nothing but sand	5	5	Within a week of laying. Throat showed a dusky streak.
Apr. 8, 1887	♂ ad..	Seeds of some boraginaceous plant and the usual mass of vegetable matter.	10	0	
Apr. 16, 1887	♂ ad..	A mass of broken-down vegetable matter	5	5	Sexual organs fully developed.
Apr. 16, 1887	♂ ad..	Nothing but gravel	5	5	
Apr. 16, 1887	♀ ad..	A mass of grain, vegetable matter, egg-shells, and road pickings	4	6	
Apr. 18, 1887	♂ ad..	The same, with particles of wheat	4	6	Sexual organs fully developed.
Apr. 18, 1887	♀ ad..	One entire oat, particles of wheat, and some gravel	4	6	Sexual organs hardly showing any signs of enlargement.
Apr. 19, 1887	♂ ad..	One entire oat, a mass of vegetable matter, including wheat and some sharp gravel.	4	6	
Apr. 19, 1887	♀ ad..	A mass of vegetable matter, including wheat particles and gravel	4	6	
Apr. 23, 1880	....	Buds of trees and broken grain, evidently the refuse of horses	4	6	
Apr. 23, 1880	....	Flower buds of soft maple	4	6	
Apr. 23, 1884	....	Seeds of Chenopodium, oats, elderberries, seeds of Amaranthus, larvæ (about three-quarters of an inch long) of a geometrid moth and fragments of Coleoptera.	10 0 5 10 10 5	0 10 5 0 0 5	This represents the combined contents of twenty gizzards, all from the same flock.—W. B.
Apr. 21, 1887	♀ ad..	One oat and a large mass of buds, with sharp gravel	6	10	
Apr. 25, 1887	♂ ad..	One oat and a mass of vegetable matter	3	7	
Apr. 25, 1887	♀ ad..	Unrecognizable vegetable mass and sand	5	5	
Apr. 25, 1887	♂ ad..	The same	5	5	
Apr. 25, 1887	♂ ad..	The broken claw of a large Coleoptera; egg-shells and sand	5	5	
Apr. 28, 1887	....	Broken grain	5	5	
May 3, 1887	♀ ad..	About ten grains of oats, besides egg-shells and sand	0	10	
May 7, 1881	....	Buds and oats	0	10	
May 14, 1881	....	Broken oats, buds, and tender blades of grass	0	10	
May 17, 1880	....	Broken grain and buds	0	10	
May —, 1885	♀.....	Four measuring-worms (*Geometridæ*)	10	0	One of a large flock similarly feeding.
June 2, 1880	....	Broken grain, flowering buds, and Coleoptera	4 0 5	6 10 5	
July 18, 1885	♂ yg..	Fragments of oats and clover seeds	0	10	
July 29, 1885	♂ yg..	Seeds of timothy and other grasses	0	10	Just beginning to show black throat patch.
July 29, 1885	♀ yg..	Fragments of Coleoptera and of brick	5	5	This and the preceding, though both evidently birds of this year, show a remarkable development of the sexual organs, suggesting the possibility of their breeding this season.

Date.	Sex.	Contents of gizzard.	Points.		Remarks.
			For.	Against.	
July 30, 1885	♂	Vegetable remains, gravel, and fragments of brick	5	5	
July 30, 1885	♂	Same as last, plus fruit	0	10	
July 30, 1885	♂	Oats, unripe grass seeds, and gravel	0	10	
July 30, 1885	♀	Buds	0	10	
July 31, 1885	♂	Wheat and other seeds	0	10	Evidently breeding still.
Aug. 1, 1885	♀	Mass of buds and fragments of grain	0	10	About to lay.
Aug. 1, 1885	♂ yg.	Young grasshoppers	10	0	
Aug. 1, 1885	♂	A mass of broken Indian corn	5	5	
Aug. 1, 1885	♀	Seeds of *Carex*, *Polygonum*, *Convolvulus*, and five young grasshoppers	6 10 10	4 0 0	
Aug. 1, 1885	♂ yg.	Three grasshoppers	10	0	New feather on chin just showing black.
Aug. 4, 1885	♂ yg.	One grasshopper and some Indian corn	10	0	In first plumage, mottled on rump.
Aug. 4, 1885	♂ yg.	Nothing but gravel	5	5	Apparently a nestling.
Aug. 5, 1885	? yg.	Tender grass shoots and grasshoppers	8	2	Corn, probably from manure, on account of season.
Aug. 5, 1885	? yg.	The same	8	2	
Aug. 6, 1885	♀	Three or four grains of wheat and some sand	0	10	
Aug. 7, 1885	♂ yg.	Grass shoots and fragments of seeds	4	6	
Aug. 8, 1885	♂ yg.	Grass shoots and grasshoppers	8	2	
Aug. 8, 1885	? yg.	Sand, grass, and broken cereals	0	10	
Aug. 8, 1885	♀	Broken grain and fragments of egg-shells of barn fowl	4	6	Containing one egg ready to be laid and several less fully developed.
Aug. 9, 1885	♀	Wheat, grass blades, buds, and gravel	0	10	Throat with faint dusky patch.
Aug. 11, 1885	♂ yg.	Indian corn, wheat, and other seeds	2	8	
Aug. 15, 1885	♀	Oats, *Carex*, and other seeds	2	8	
Aug. 15, 1885	♀	Remains of a grasshopper and some gravel	10	0	
Aug. 15, 1885	♂ yg.	Grass seeds, gravel, and seeds of *Carex*	2	8	Just getting the black chin patch; no sign of sexual activity.
Aug. 15, 1885	♀	Currants, buds, grass shoots, and gravel	0	10	
Aug. 17, 1885	♀	Grass shoots and gravel	4	6	Adult, yet apparently of a this year's brood.
Aug. 17, 1885	♀	Buds, coal, glass, and egg-shells of barn fowl	4	6	
Aug. 17, 1885	♀	Broken corn, wheat, and oats (horse refuse)	10	0	
Aug. 17, 1885	♀	The same	10	0	
Aug. 18, 1885	♂	Grasshoppers and seeds of *Carex*	10	0	
Aug. 19, 1885	♀	Seeds of *Carex*, grass shoots, and broken grain (horse refuse)	9	1	In extreme of molting.
Aug. 19, 1885	♀	Broken grain (horse refuse), corn, grass shoots, and shells of barn-fowl eggs.	8	2	
Aug. 20, 1885	ad.	Broken oats (pickings from horse manure) and fragments of grasshoppers.	10	0	Shot in St. Matthew's ward, in the city.
Aug. 20, 1885	ad.	The same	10	0	
Aug. 20, 1885	ad.	The same	10	0	
Aug. 25, 1885	yg.	Broken oats (from horse manure), seeds of *Verbena hastata*, and fragments of grasshoppers.	10	0	All from one flock that was feeding on the Don Flats, then overgrown with the plant named.—W. B.
Aug. 25, 1885	yg.	The same	10	0	
Aug. 25, 1885	yg.	The same	10	0	
Aug. 25, 1885	yg.	The same	10	0	

Aug. 25, 1885	yg..	The same	10	0	Killed in East Toronto by W. Squires.
Aug. 25, 1885	yg..	The same	10	0	
Aug. 25, 1885	yg..	The same	10	0	
Aug. 27, 1885	ad..	An unrecognizable mass of broken-down vegetable matter and sharp sand	5	5	
Aug. 27, 1885	ad..	The same	5	5	
Aug. 27, 1885	yg..	The same, plus remains of grasshoppers	10	0	
Aug. 27, 1885	yg..	The same as preceding	10	0	
Aug. 27, 1885	yg..	The same as preceding. In this the species of grasshopper was clearly made out by the head and legs as *Caloptenus femur-rubrum.*	10	0	
Aug. 29, 1885	yg..	Fragments of *Caloptenus femur-rubrum* and sharp sand	10	0	Shot in Rosedale by C. Armstrong.
Aug. 29, 1885	yg..	The same	10	0	
Aug. 29, 1885	yg..	The same	10	0	
Aug. 29, 1885	yg..	The same	10	0	
Sept. 3, 1885	ad..	A mass of broken-down vegetable matter	5	5	Shot on Don Flats.—W. B.
Sept. 3, 1885	ad..	The same	5	5	
Sept. 3, 1885	yg..	The same	5	5	
Sept. 3, 1885	ad..	The same, plus fragments of grasshoppers	10	0	
Sept. 3, 1885	yg..	The same as preceding	10	0	
Sept. 3, 1885	yg..	The same as the preceding	10	0	Shot on Don Flats.—W. B.
Sept. 3, 1885	yg..	A mass of vegetable matter and pupæ of Diptera	5	5	
Sept. 3, 1885	yg..	The same as preceding	5	5	
Sept. 3, 1885	yg..	A mass of vegetable matter and three small lepidopterous larvæ	10	0	
Sept. 13, 1885	....	A mass of broken-down vegetable matter, with sharp sand	5	5	Killed at two discharges of the gun at Greenwood's Crossing, Toronto.—W. B.
Sept. 13, 1885	....	The same	5	5	
Sept. 13, 1885	....	The same	5	5	
Sept. 13, 1885	....	The same	5	5	
Sept. 13, 1885	....	The same	5	5	
Sept. 13, 1885	....	The same, with portions of femora of *Œdipoda carolina*	10	0	
Sept. 13, 1885	....	A mass of broken-down vegetable matter, with sharp sand and fragments of grasshoppers (species not made out).	10	0	
Sept. 13, 1885	....	The same	10	0	
Sept. 13, 1885	....	The same	10	0	
Sept. 13, 1885	....	The same	10	0	
Sept. 13, 1885	....	The same	10	0	
Sept. 13, 1885	....	The same	10	0	
Sept. 13, 1885	....	The same	10	0	
Sept. 13, 1885	....	The same	10	0	
Sept. 13, 1885	....	The same	10	0	
May 10, 1887	♂ ad..	A mass of broken grain, chiefly oats, and very sharp sand	5	5	Sexual organs apparently in full size and activity.
May 10, 1887	♂ ad..	The same	5	5	
May 10, 1887	♂ ad..	Five entire oats, two of the kernels quite hard, the rest apparently from manure; also a mass as in the above.	5	5	
May 10, 1887	♂ ad..	Five entire oats, one kernel hard, and a mass of broken grain, chiefly oats, and sharp sand.	5	5	
May 10, 1887	♂ ad..	A mass of broken grain, chiefly oats, and sharp sand	5	5	
May 10, 1887	♂ ad..	One entire oat and a mass as in the preceding	5	5	
May 10, 1887	♂ ad..	The sharp angular fragments of a large grain of Indian corn, apparently broken by the bill of the bird, and egg-shells.	5	5	
May 10, 1887	♂ ad..	Five grains of oats and a mass of grain and vegetable matter too much reduced for recognition.	5	5	
May 10, 1887	♂ ad..	In gullet two grains of wheat and four grains of oats; in gizzard a mass of broken grain and vegetable matter, and egg-shells.	5	5	

Date.	Sex.	Contents of gizzard.	Points.		Remarks.
			For.	Against.	
May 10, 1887	♀ ad.	A mass of broken grain and unrecognizable vegetable matter, and egg-shells.	5	5	Within a few days of laying.
May 10, 1887	♀ ad.	The same	5	5	
May 10, 1887	♀ ad.	The same	5	5	Ovaries showing almost no enlargement or signs of activity.
May 10, 1887	♀ ad.	One entire oat and a mass as above	5	5	
May 10, 1887	♀ ad.	Two entire grains of wheat and a mass as above	5	5	
May 10, 1887	♀ ad.	One entire oat and a mass as above	5	5	
May 10, 1887	♀ ad.	A mass of broken Indian corn and egg-shells	5	5	
May 10, 1887	♀ ad.	A mass of broken grain and vegetable matter, also sand	5	5	

NOTE.—The last seventeen birds were shot in Toronto Marsh; apparently they gathered the grain found in them from adjacent wharves, cowbyres and distilleries.

This gives a total of one hundred and twenty dissections, in forty-seven of which were found insects, making 39 per cent. of the sparrows insectivorous, and, estimated in points according to Dr. Brodie's valuation, gives seven hundred and ninety-five for and five hundred and thirty-four against; majority in favor of *Passer domesticus*, two hundred and sixty-one.

ERNEST E. THOMPSON.

TORONTO, *Ontario*.

[Forest and Stream, Vol. XXV, No. 2, pp. 24, 25. August 6, 1885.]

THE ENGLISH SPARROW.—VERDICT OF THE AMERICAN ORNITHOLOGISTS' UNION.

At the meeting of the Council of the American Ornithologists' Union, held in Washington, April 21, 1885, the committee appointed in September, 1883, to inquire into the question of the eligibility or ineligibility of the European House Sparrow in America, rendered its final report, which was accepted and adopted as the sense of the Union on the subject, and the committee was discharged with the unanimous thanks of the Union. The report, which was accompanied by a large quantity of valuable data, is here given:

Mr. President and members of the Union:

Your committee, appointed to inquire into the eligibility of the European House Sparrow (*Passer domesticus*) as a naturalized resident in this country, has the honor herewith to submit its report. After due consideration, your committee adopted the following form of circular letter, which was framed to elicit information from all quarters and from all interested persons:

"The American Ornithologists' Union, an organization resembling the British association of similar name, and including in its active membership the most prominent ornithologists of the United States and Canada, purposes, among other objects already engaging its attention, to determine as nearly as possible the true status in America of the European House Sparrow (*Passer domesticus*), commonly known as the English Sparrow, in so far as the relations of this bird to mankind are concerned. The Union hopes to secure, through the solicited testimony of others, as well as the personal observations of its members, the facts necessary to settle the question of the eligibility or ineligibility of this Sparrow as a naturalized resident of this country. The question of the European House Sparrow in America is regarded as one of great economic consequence, to be determined primarily by ascertaining whether this bird be, upon the whole, directly or indirectly injurious or beneficial to agriculture and horticulture. Its economic relations depend directly and mainly upon the nature of its food; indirectly upon the effect, if any, which its presence may have on useful native birds and beneficial insects. The accompanying formula of questions is respectfully submitted to the attention of those who may be able and willing to record statements of positive facts and value derived from their own experience. Concise and unquestionable answers returned to the undersigned on inclosed blank, or otherwise, or communicated to any member of the committee, will be appreciated and prove of high value among the data upon which it is hoped that this vexed question may be set at rest. The evidence thus obtained will be carefully considered by the committee in preparing its report to the Council of the Union, and a digest of the same, with recommendations, if any, will be submitted by the Council to the mature judgment of the Union at its next annual meeting. The following-named active members of the Union were, at the first congress, appointed a committee to investigate and report upon this subject: Dr. J. B. Holder, of New York, chairman; Mr. Eugene P. Bicknell, of New York; Mr. H. A. Purdie, of Boston, Mass.; Mr. Nathan Clifford Brown, of Portland, Me.; Mr. Montague Chamberlain, of St. John, New Brunswick; the committee having the power of increasing its membership at its discretion.

Dr. J. B. HOLDER, *Chairman.*

"AMERICAN MUSEUM OF NATURAL HISTORY,
Central Park, New York City, February 2, 1884.

"*Data concerning the European House Sparrow, from* ——— ———.

"1. Is the European House Sparrow (*Passer domesticus*) known in your neighborhood, and, if so, about when did it appear? 2. Is your neighborhood city, suburbs, or country? 3. Is this Sparrow abundant? 4. Is it increasing in numbers? 5. How many broods and young yearly to a pair? 6. Is this Sparrow protected by law? 7. Is it artificially fed and housed? 8. Does it molest, drive away, or diminish the numbers of native birds? 9. If so, what species? 10. Does this Sparrow injure shade, fruit, or ornamental trees? 11. Does it attack or injure garden fruits and vegetables? 12. Does it injure grain crops? 13. Is it an insect-eater or a seed-eater? 14. What insects, if any, are chiefly eaten by this Sparrow? 15. What is the principal food it carries to its young? 16. What insects, if any, are carried by it to its young? 17. Does the food of the old bird vary with the seasons, and if so, in what way? 18. Does the food of its young vary, and if so, how? 19. If any insects are eaten, are they beneficial or injurious species? 20. Does the Sparrow eat the larvæ of the vaporer moth (*Orgyia leucostigma*)? 21. Does it eat ichneumon flies? 22. Do you determine the nature of this bird's food and that furnished by it to its young by inference, direct observation, or dissection? 23. Have any injurious insects been exterminated or materially lessened in numbers by this Sparrow? 24. Have any injurious insects increased in numbers, or appeared where unknown before, in consequence of the destruction of other insects by this Sparrow? 25. Have these Sparrows in your neighborhood been destroyed systematically or otherwise, and if so, by what means? 26. What bounty, if any, has been offered for their destruction? 27. What is the general sentiment or balance of public opinion respecting the European House Sparrow in your locality? 28. On the whole, in your judgment, is this Sparrow an eligible or ineligible species in this country?"

In order to secure a thorough presentation of the subject to those most likely to respond satisfactorily, each member of the committee assumed the duties of correspondence in his own section of the country, as well as in certain allotted sections of the entire United States and Canada. Copies of the letter were sent to the agricultural papers, to the various journals having columns devoted to zoological and rural matters, and to the press at large. The greater part, however, was directed to individuals believed to possess facts pertinent to the subject. About one thousand copies were thus sent out.

A large proportion of the answers received are of one import, written by persons having no definite data to communicate, but who, having experienced annoyance from the bird's uncleanliness and unmusical notes, desire to see it exterminated. Under this head belong the numerous petitions which have reached us from several quarters, notably from Philadelphia. The subject is regarded sufficiently important by the inhabitants of that city to warrant the issue of printed forms, which, with long lists of subscribers, have been submitted to the consideration of your committee. The paucity of replies to many of our questions renders it impossible to report upon them decisively. Others, however, are fortunately very fully answered.

Returns to the first question give some data of interest in relation to the time of the Sparrow's first introduction into this country. The earliest date of importation known to us is 1858,* when Mr. Thomas A. Deblois liberated a few individuals at Portland, Me. These disappeared shortly afterward, and were not successfully replaced until 1875. In 1858 Sparrows were liberated at Peacedale, R. I., by Mr. Joseph Peace Hazard. They were first introduced into Central Park, New York City, according to Mr. Conklin, the superintendent of the menagerie, in the year 1864. In 1860 Mr. Eugene Shiefflin turned loose twelve birds in Madison Square, New York City. In 1868 the species was first introduced into Boston Common. In 1869 a number were given the liberty of the parks of Philadelphia. Somewhat later a successful attempt was made to establish a colony near Great Salt Lake, Utah, and about the same time the birds became resident at Indianapolis, Ind.

In a period of about ten years the Sparrows reached nearly all the large towns and cities of New England and the Middle States and many of those of the Western States without artificial assistance. It also made its appearance in suburban towns and even country villages. From the Southern States and the Western States beyond the Mississippi River we have received but few returns, and most of these state that the Sparrow has not been observed. In Canada it has become generally distributed over the southern sections of Quebec and Ontario (it is abundant in the city of Quebec), and in 1884 several flocks invaded New Brunswick.

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*[This was an error. Two importations at least were known to have been made at Brooklyn, N. Y., before 1853. See page 17 of this Bulletin.—W. B. B.]

Few observers have definitely determined the number of broods hatched yearly by this bird and the number of young to the brood. We have, however, returns from several ornithologists. The maximum given by Mr. H. B. Bailey, of Orange, N. J.—six broods in one season, with from four to five young to a brood—probably indicates the extent of the bird's fertility in this climate. The usual number of broods in the latitude of New York and southward appears to be four. In more northern districts three broods yearly would probably be near the average.

There is an overwhelming mass of testimony to the effect that the Sparrow molests and drives away certain of our most valued species of native birds. Many statements have been received giving accounts of conflicts provoked by the Sparrow in which it was cruelly victorious. It is affirmed that from some localities native species have been completely banished by the attacks or by the mere presence of the foreigner. We have also evidence of an opposite character declaring the Sparrow's peaceable disposition and its association upon amicable terms with other species of birds.

Most of our correspondents state that they have never known the Sparrow to commit depredations upon crops, but well-authenticated instances are furnished showing its ability and disposition to accomplish great destruction to grain. Mr. Stewart, of Hackensack, N. J., relates the destruction of a wide margin of wheat in the field. Hon. G. A. Bicknell, of New Albany, Ind., says: "When the grain ripens, the Sparrows leave the city and attack the wheat fields in the suburbs. I have seen hundreds of them at once in my fields, and they get about half the crop." Mr. T. G. Gentry, in his exhaustive work on the Sparrow, gives similar instances. That the bird feeds upon fruits is amply attested.

Our thirteenth question calls for information as to the Sparrow's preference for food. Is it an insect-eater or a seed-eater? Every reply to this question which is based upon dissection agrees in attributing to the bird a diet almost wholly vegetable. The statement of some observers that it devours canker-worms and a variety of insects is unaccompanied by reports of examinations of the stomach.

The question as to the food of nestling Sparrows elicited pretty uniform testimony, animal matter in some form being said to constitute the bulk. Dissections by a competent person, however, show "barely a trace of insect or animal food, but in lieu fine gravel and vegetable fiber."

Responses to questions seventeen to twenty-one inclusive are too meager to be of value.

It is claimed by several of our correspondents that the measuring-worm, so abundant at the time of the Sparrow's introduction into this country, was well-nigh exterminated by the bird, so that for a considerable period it was unobserved. Since it is a well known fact that the worm occurs in very variable numbers in different seasons, credit for its comparative extermination in this case can hardly be given to the Sparrow upon the doubtful evidence before us.

The experiment has recently been tried in Philadelphia and elsewhere of substituting Sparrows for pigeons in trap-shooting, but, of course, without seriously diminishing their numbers. In other localities the birds have been poisoned or otherwise gotten rid of to some extent by indignant citizens in defiance of laws.

The balance of public opinion is strongly adverse to the Sparrows. Our returns, however, show protective laws (usually the same statute which provides for the security of other small birds) in Maine, New Hampshire, Vermont, Rhode Island, New York, New Jersey, Ohio, Michigan, the District of Columbia, and Canada. The Massachusetts law has lately been repealed, and specially exempts the English Sparrow from protection.

So much for the evidence. We have learned the capacity and disposition of this bird to injure grain and fruits, and that when gathered in large numbers it threatens very seriously the interests of the farmer and horticulturist. Although testimony of a certain kind indicates that its young are fed with insects, actual dissection shows that vegetable substances are mainly employed. The adult birds feed almost exclusively upon seeds and grains. They drive away from their accustomed haunts, either directly or indirectly, many of our native insectivorous species. It may be added that they have proved in recent years so destructive of crops in other countries as to render it necessary to enact laws looking to their extermination. In view of these facts, your committee believes that the European Sparrow (*Passer domesticus*) is an ineligible species in this country, and that it was a mistaken policy to introduce the bird. And we would respectfully recommend:

(1) That sheltering or otherwise fostering the Sparrow by the public be discouraged, and that its introduction artificially into new localities and its sale for such purposes be forbidden by law.

(2) That all existing laws protecting the Sparrow be repealed, and that bounties be offered for its destruction.

Signed,
J. B. HOLDER,
Chairman.
EUGENE P. BICKNELL.
H. A. PURDIE.
NATHAN CLIFFORD BROWN.
MONTAGUE CHAMBERLAIN.

[The Michigan law protecting these birds has been repealed—Ed. F. & S.]

[New York Tribune, 1885.]

We have here at the New York State Experiment Station [Geneva, N. Y.] many varieties of cereals on different parts of the grounds, planted for study and comparison. In 1884, upon the wheat heads attaining the milk stage, the European Sparrows began feeding on the undeveloped grain. They would alight on the wheat or oat stalks, bend them to the ground, and ruin the heads or panicles. They almost spoiled a choice plat of experimental wheat. This year the same thing has been repeated in a more pronounced manner; we have had to cover some special wheat plants with mosquito netting in order to preserve the seed. Those plants uncovered were in a large degree ruined.

We had twenty-six wheat plants near a wooded ravine. As soon as the heads began to fill, the Sparrows and blackbirds began their pernicious work, eating such quantities of grain that the result of the experiment will be of no value. It was impossible to suppress them, as they worked long ere the sun appeared. Our large wheat field was patronized by liberal flocks of blackbirds and Sparrows. I have been among the wheat fields of this vicinity and seen Sparrows either upon the fence close by or in the wheat. I have conversed with many persons visiting the station, and wherever the Sparrow is well known, and grain fields are common, I am told the Sparrow does eat the grain.

Last year I dissected many Sparrows; found a few insects in some, and those as a rule the remains of ants, but hardly a stomach was there that did not contain wheat or oats. Four days ago I examined nineteen stomachs, and in all but one was found wheat. In two stomachs were apparently chitinous parts of ants. Sparrows also patronize in a liberal manner some kinds of garden seeds, especially lettuce. One large seed-grower pronounces these birds great destroyers of seeds. I have noted also in the agricultural press that Sparrows destroy the tender buds of some ornamental shrubs and trees. At the station we have seen them eating pear buds, or picking them open. (Charles S. Plumb.)

[Cincinnati Daily Commercial Gazette, July 2, 1887.]

* * * We have one bit of damaging evidence against the good character of the Sparrow, which we have not seen mentioned in print anywhere else, in all the array of evidence against him. Last year we cut a small field of heavy wheat in which a few hundred Sparrows had camped. Not only around the border, but all through the middle of the field, where the wheat was heaviest, it was broken down and tangled, so that fully one fourth of the crop was lost. As soon as the wheat kernel had formed the vandalism began.

Here is the damaging point. A close inspection revealed the astounding fact that the ground was literally covered with mashed kernels of wheat to the extent of several bushels to the acre. While the kernel is yet soft they will not swallow it whole. With their short, powerful beaks they easily press out the milky substance, let the rest drop, and go to the next. Let this point be noted for what it is worth. I trust the prosecuting attorney will dwell upon it, and that the judge will mention it in his charge to the jury before they retire to deliberate upon a verdict soon to be rendered for or against the English Sparrow. (A. D. Binkerd, M. D., Cochran, Ind., June 12.)

[Albany (N. Y.) Express, Friday, October 7, 1887.]

* * * Sparrows are also noted once more on the stands of the game dealers, and retail, for chicken pies, at 30 cents per dozen. Joseph Clark, the well-known State-street fruiterer, yesterday took in 3,000 of the little birds, paying $1 per hundred for them to the youthful hunters, who have once more resumed the slaughter of the innocents on the outskirts of the city, more especially up in the west end.

[New York Times, July 20, 1887.]

Sparrows are being properly appreciated. Hundreds of them are now caught by enterprising people for sale to certain restaurants where reed birds are in demand. A German woman on Third avenue has three traps set every day, and she catches probably seventy-five a week. They are cooked and served to her boarders the same as reed birds and are declared quite as great a delicacy. This German woman bastes them, leaving the little wooden skewer in the bird when served. They are cooked with a bit of bacon. She tempts them with oats, and after the catch they are fed a while with boiled oaten meal. She sprinkles oaten meal in the back yard also, and thereby fattens the free birds. The females are the choice meat. The males can be told by the circle of white feathers at the neck. The females are as plain as Quakeresses. So soon as it becomes known that the Sparrow is a table bird their number will rapidly grow less. People don't like to experiment, but when it is discovered that the Sparrow has been declared good by those upon whom they have been tried, no boarding-house meal will be deemed in good form unless a dish of fat Sparrows adorns it. Sparrow pie is a delicacy fit to set before a king.

[Cincinnati Weekly Commercial, April 19, 1882.]

H. E. B., of Plymouth, Mich., in the *Country Gentleman*, narrates his test of the Sparrow as an insect eater. He was in pursuit of the codling moth, which had been carried into the cellar with the winter supply of apples. He knew the habits of the codling moth and expected them to come out of his apple barrels and seek hiding places. Accordingly he laid two boards together, convenient for the broods to conceal between and spin the cocoons. As expected, the boards were stuck together with the cocoons, and in the spring he carried them out and spread the boards and cocoons in sight of the pestiferous Sparrows and hens, hoping to see the much praised insectivorous bird destroy the cocoons with alacrity. We let him tell his own story:

I was greatly mortified to see the Sparrows run over the cocoons in search of wheat screenings thrown out to call them down.

My sorrow was soon turned to joy to behold a pair of bluebirds come down, as it were out of heaven, and alight on the nearest bird-house, doubtless occupied by them last season, but which had been appropriated by the Sparrows this winter. No sooner had they alighted than their bright eyes discovered the cocoons on the boards and they darted down to secure the prize.

Disgusted with the Sparrows I took a step-ladder and commenced to clean out the Sparrow's nest in the bluebirds' house. I found in the strings that composed their nest two curculios, three snapping-bugs, one bee-miller, one old female codling moth, and two recently hatched moths. Examining the strings, I found webbings of worms and burnt edges of cloth, and ascertained that they had pulled the strings out of an old smudge left near a bee-hive under an apple tree. This led me to examine the boards placed for the bee-stands (the bee-hives had been carried to the cellar in the fall). On the boards exposed to the Sparrows all winter were numerous cocoons.

[Cultivator and Country Gentleman (Albany, N. Y.), July 29, 1886.]

* * * The universal testimony of scientists and others, as against these birds, ought to satisfy the skeptics that this is a bird detrimental to the farmers' interest. For three seasons they have assaulted our experimental plats to their material damage. This year we found it necessary to employ a boy to work from 4 a. m. till nearly dark, keeping the Sparrows at a distance. I have found them to be destroyers of grain, injurious to fruit, and early in spring very damaging to fruit buds. Outside near the window by which I write is a plum tree, where often in the spring, as buds were starting, I saw the Sparrows pick out the entire bud center. But, in addition to my own testimony, comes much damaging evidence from farmers in the vicinity, whose wheat-fields are suffering. Something must be done. Every year the evil becomes worse and worse, and even to-day great damage is done by the English Sparrows. (C. S. Plumb, Geneva, N. Y.)

[Rural World (St. Louis, Mo.), 1886.]

The introduction of the Sparrow into America, says the well-known English naturalist, Rev. J. G. Wood, "has been distinctly disastrous, as I have personally seen, and if the bird were exterminated it would be better for the country. Still more disastrous has been its introduction into Australia and New Zealand, especially in the latter country, where it has abandoned insect-eating altogether, and become a devourer of fruits and grain, eating grapes and figs by the ton." And we are quite satisfied that the sooner a policy of destruction is inaugurated the better for all concerned on this side of the Atlantic.

[Prairie Farmer (Chicago, Ill.), December 25, 1886.]

At the recent annual meeting of the Indiana State Horticultural Society, some one mentioned the English Sparrow, and a discussion was precipitated. Mr. Warder, of North Bend, Ohio, had found them both fruit and grain eaters. They had been very destructive to his grapes. They seldom eat insects, but will feed them to the young birds in the nest. Professor Troop, of Purdue University, said that a member of the senior class of that institution had killed one or more Sparrows daily during a considerable portion of the past summer, and examined the contents of their stomachs. In only one bird had he found the remains of an insect. J. C. Ratliff, of Wayne County, had seen flocks of several hundred alight on his wheat-field, five miles from any town or city, and eat and waste the grain from large areas. They beat the ripened grain from the stalk with their wings. They were still more destructive to grain in shock. Mr. Folger said that they had entirely driven away 200 martins that formerly sheltered in his barn. Mr. Ohmer formerly had plenty of song-birds on his place. Now there was only the Sparrow and robin. The time had come when something must be done. Mr. Webster had recently made an extended visit through the agricultural sections of Europe, and found that Sparrows were everywhere regarded as a nuisance. In Germany he saw boys carrying hundreds of them, strung on sticks. They were taken to the village authorities, and the boys received a half cent for each one killed. They were paying for their destruction everywhere. They were becoming very destructive in his locality. He had found their ravages on his green peas particularly annoying. After further discussion in similar strain, and some words in their defense by President Johnson and one other member, J. C. Stevens, of Wayne County, introduced a resolution declaring them a nuisance, and urging extermination, which was passed with but one dissenting voice.

[The Scientific Farmer, Vol. IV, pp. 35, 36. 1879.]

In the February number of the *Scientific Farmer* for 1878 I had occasion to speak of the sparrow war which was then raging, and which had then been in progress for some time. At present the controversy still continues, and has continued at intervals ever since. Much has been written upon the subject on both sides by able men; yet the matter appears to stand just about where it was when the first gun was fired, or, in other words, when the first article appeared, denouncing the Sparrows as not only injurious to agricultural interest, but also proclaiming that they were enemies to our native birds. The latter-named accusation has been made oftener than any other, and it has been repeatedly stated that the rightful inhabitants of the trees and shrubbery of our parks are being rapidly driven away by the unprovoked attacks of the pugnacious Sparrows. Although this may be a fact, as accumulated testimony indicates, yet I do not consider that it is the essential point of dispute; for, practically, it can make but little difference if our native birds are driven away, provided the Sparrows take their places and devour an equal quantity of insects. This important matter up to date has, however, been but slightly touched upon, for no one has made an extended examination of the contents of the stomachs of the Sparrows, at least in the vicinity of Boston. As this is *absolutely* the only method by which we can ascertain satisfactorily just what the birds do eat, this investigation must be made before any one can give a decided opinion upon the subject, that will conclusively settle a matter which has been so long agitated.

I do not mean to be understood to say that the ornithologists who have written upon this subject do not consider it necessary to examine the contents of the stomachs of the Sparrows, for they all see that it must be done sooner or later; but hitherto no one has done it to any extent. In my article for February, last year, I ventured to suggest that the legislature of our State appoint proper persons to do this work; but as this has not been done, and as I have heard it intimated that this examination is impracticable, I concluded to try and see how it would work. Assisted by some young friends, I procured a number of English Sparrows each day last autumn, and made a careful examination of their stomachs. These birds were killed along the streets from the Watertown arsenal to Winter street, Boston, and therefore I judged that they were fair representatives of the typical, and now famous, Sparrows of the "Hub." Through the kindness of my friends, the birds were given to me fresh, and thus I could tell exactly what they had in their crops and stomachs. Let me here state, in order to show that my work has been done accurately, that I have long made a specialty of ascertaining the contents of the stomachs of various birds, having now by me notes of the dissections of over five thousand specimens. It has been stated that it is impossible to detect the presence of any insects, especially of the softer larvæ, after they have been swallowed and partly digested; this is not a fact, however, and any one who has examined the interior of even a strictly insectivorous bird, and in summer, will bear me out in this statement.

The wing coverts of beetles, and the harder portions of all other insects, never digest, and thus are always to be seen; while by washing the half-digested mass in water, the skins of the larvæ may be found, even after they have been swallowed for some time, and are always plainly perceptible when first eaten. In every case examined where there was the slightest obscurity as to what had been eaten by the Sparrows, I washed the contents of the stomachs in water, and in all cases used a lens in determining what they were. In fact, I exercised all the care possible, and am perfectly satisfied that nothing of importance, least of all an insect or anything pertaining to an insect, could have escaped my observation.

To show exactly what each bird had eaten, I copy directly from my note-book, giving the dissections as I made them, with the date. I also give the age of the individual, and, as explanatory, will remark that by "young" I mean birds that were hatched that year, and by "nestlings," birds which were not fully grown; adult being, of course, perfectly mature birds. My record commences with September 17 [1878].

No.	Date.	Age.	Contents of stomach.
	1878.		
1	Sept. 17	Young ..	Seeds and small stones.
2	17	....do	Seeds, woody fibers, and bits of grass.
3	18	....do	Small, dark-colored seeds.
4	18	....do	Grass-seeds and large, double, tough-skinned seeds.
5	18	....do	Remains of dark-colored seeds, woody fibers, and small stones.
6	19	....do	Small stones predominating, with some dark-colored seeds and a few lighter-colored seeds.
7	19	... do	Oats, woody fibers, and small stones.
8	20	....do	Dark-colored seeds, small stones, and woody fibers.
9	20	.. do	Green seeds, dark-colored seeds, and small stones.
10	20	....do	Seeds, small stones, woody fibers, and the remain of oats.
11	20	....do	Dark-colored seeds, woody fibers, oats, and small stones.
12	20	... do ...	Woody fibers, seeds, and small stones.
13	20	...do	Do.
14	20	...do	Seeds, small stones, and oats.
15	20	.. do	Do.
16	20	....do	Do.
17	26	....do	Small stones, seeds, and woody fibers.
18	26	....do	Do.
19	26	...do	Oats, seeds, and woody fibers.
20	26	....do	Seeds, stones, woody fibers, and egg shells.
21	26	Nestling.	Stomach very soft; woody fiber, leaves, and small pieces of brick.
22	26	....do	Seeds, small stones, small pieces of brick, bits of porcelain, and the remains of a kernel of corn.
23	26	....do	Black seeds in quantities, and small stones.
24	27	Young...	Seeds, stones, and oats.
25	27	....do	Remains of corn and small stones.
26	Oct. 1	....do	Seeds, stones, and woody fibers.
27	1	....do	Black seeds and small stones, but by far the greater portion of the contents of this stomach consists of woody fibers, which I now ascertain to be macerated bits of hay from horse manure.
28	1	....do	Black seeds, small stones, but mainly bits of hay from horse manure.
29	2	Adult....	Black seeds, with a considerable quantity of small stones.
30	2	Young...	Seeds, small stones, and bits of hay.
31	3	....do ...	Woody fibers, small stones, and oats.
32	3	Adult....	Oats, small stones, and seeds.
33	3	Young...	Corn, oats, and bits of hay.
34	3	....do	Oats, seeds, and bits of grass.
35	3	Adult....	Do.
36	3	Young...	Bits of green leaves, stones, and seeds.
37	3	...do	Oats, seeds, and small stones.
38	3	...do	Seeds and small stones.
39	4	Adult....	Green seeds, oats, black seeds, and bits of grass.
40	4	...do	Corn, seeds, and stones.
41	4	...do	Black seeds and stones.
42	4	...do ...	Bits of hay, pieces of crockery, and small stones.
43	4	Young...	Oats, seeds, and stones.
44	4	Adult....	Bits of hay, oats, and small stones.
45	4	....do	Seeds, stones, and corn.
46	4	Young...	Oats, bits of hay, and small stones.
47	4	Adult....	Seeds and small stones.
48	4	....do	Do.
49	4	....do	Small seeds and small yellow stones.
50	4	....do	Seeds, bits of hay, and small stones.
51	4	Young...	Black seeds and small stones.
52	10	....do	Seeds and small stones.
53	10	....do	Seeds, small stones, and bits of hay.
54	10	Adult....	Seeds, small stones, and oats.
55	10	....do	Do.
56	10	....do	Seeds, bits of hay, and oats.

As seen, on October 10 I discontinued my observations. The entire absence of insect food is noticeable; yet this did not in the least surprise me, for although I did expect to find a few insects when I first commenced, I ceased to expect them after I saw how thoroughly granivorous these birds were.

I have found that as a rule our sparrows, finches, and grossbeaks (and I now speak of these species as they occur in Massachusetts) eat but few insects. Thus out of two hundred and eighty-four individuals, taken at all seasons, which I have examined, embracing seventeen species, but eighty-one had taken insects; and if we exclude the rose-breasted grossbeak and the savanna sparrow, which are much more insectivorous than any others, I find that only about six per cent. of those examined had eaten insects, and these were taken mainly in spring, summer, and autumn; rarely in winter. Some species never eat insects when they can get seeds, and their anatomical structure is eminently fitted for gathering and digesting these latter-named articles of diet. The structure of the English Sparrow is very similar to that of some of our strictly granivorous birds. Thus the gullet is dilated into a crop, a character seldom seen in insectivorous birds. The proventriculus is small, but the stomach has very thick and muscular walls, and is lined with a strong, somewhat rugose membrane. The duodenum is long and incloses a large pancreas, which secretes a fluid that assists to digest the oily matter from seeds. This kind of food is rudely gathered, and in many instances crushed by the strong bill. The cœca are small. All this shows clearly that we have to deal with a granivorous bird which may possibly at some seasons eat insects, but certainly not in the autumn, as I have endeavored to show.

At first thought it may appear that I have chosen a time which was unfavorable to the English Sparrows, as seeds are very abundant in the autumn; but neither are insects scarce then, and I chose this time as being one in which the birds would exhibit their preference; and they certainly have shown no inclination to take insects. If, however, we turn to some of our native species of sparrows which often take insects (and I will, at the suggestion of my friend, Mr. J. A. Allen, select the song sparrow), we shall find that they eat some insects all through the autumn, although seeds of course form the greater portion of their food. Yet the few insects taken show that they occasionally prefer them.

To my mind it is clear that the English Sparrows are pampered too much. They have access to all the grain that they want, and will then eat nothing else. To make an exceedingly long story shorter, let us have proof that they do or do not eat insects, and then the matter will be decided beyond a doubt; and again I would venture to recommend most urgently that the legislature of Massachusetts authorize some one to make a series of dissections of the English Sparrow throughout the entire year, for in no other way can the matter be decided. I do not consider my proofs as conclusive, but as far as they have gone they are certainly convincing, and I am inclined to look upon the Sparrows as utterly unworthy of protection; yet I am still open to conviction in their favor, and if any one will show me one—I ask not ten nor even three, but only one—English Sparrow from Boston that has voluntarily eaten an insect of any sort or kind I will at once modify my opinion respecting them. (C. J. Maynard.)

[Farmer's Home Journal, Louisville, Ky., October 2, 1886.]

Bowling Green, Ky., September 25, 1886.—The English Sparrow has heretofore been very destructive upon grains and fruits in and near the towns of this part of the State, but seems to have been this season three or four times as bad as ever, because, probably, of increase of number. He is gradually making his way into the country districts. In the city this year all fruits suffered greatly, and with some of us the grapes not protected with bags or otherwise were all taken, and whenever the weather made a hole in the bag covering a variety of grape that, when ripe, was black or red he has torn off the bags. The rascal has strong jaws and great energy, and will work industriously until he has made shreds of a bag that he once attacks. It seems that the quality of the bags themselves is not as good as formerly, and on all the later colored grapes the long exposure of them made more holes than usual. All unprotected Clintons, Nortons, Herbemonts, Catawbas, indeed all colored grapes, went as soon as they began to color well, and even of those that were bagged more than half were taken, the latter by reason of the opening made by the weather in the bags, and consequent knowledge to the Sparrow of what was inside. My own loss in this way was not less than five hundred bags. Some of our grape-growers affirm that having once found out that the bags had grapes in them the Sparrow did not confine his attacks to the injured ones, but destroyed the perfect bags as well.

Passing on horseback in summer on the outskirts of the city and looking across a vacant square in which oats had been grown and were then in the shock, in the direction of the sun, I noticed a white cloud around the head of the shocks like an aureole. I rode around to the rear of the square and found that it was the reflection on the oat chaff thrown out by innumerable Sparrows perched on the shocks and devouring the grain. It was clear to me then that the farmer would ultimately suffer greatly unless a remedy is found against the increase of the Sparrow. At the meeting of the Warren County Horticutural Society this matter has been discussed much recently, and many schemes have been suggested to accomplish this. Generally such experiments as have been made seem to demonstrate that some form of poison given with food is about the most promising.

Opposite my residence, and across the street, is the rear of a square occupied as a lumber-yard, and next the fence is a shed 100 feet long and 12 feet wide. I thought this offered a good opportunity to try the effect of poison on these pests, as it would be secure from fowls and animals. Accordingly I prepared a mixture of meal and flour, plentifully sprinkled with strychnine, and put it on the roof. I saw no dead birds and no evidence of its effect until citizens a square away began to talk about the fatality among the Sparrows, numbers of them being found dead. Closer observations showed that after taking the food, and when its first twinges were felt, they sprang into the air and went with rapid flight until they fell dead. Very many were killed, as they greedily devoured all the food given. I did not repeat the experiment, as I was away from home much thereafter, but am mad enough now over the losses among my grapes to organize a regular campaign of this sort, and many are like minded with myself. The orioles are very bad, but they are very beautiful, and unlike the poor and the Sparrows, we have them not "always with us." Close observation makes one believe that the robins do comparatively little harm, as they seldom if ever puncture the grapes, as they take and swallow a whole berry at a time, and I think three Concords is the maximum for a meal. ([Judge] W. L. Dulaney.)

[Bulletin No. 10, Division of Entomology, U. S. Department of Agriculture.]

OUR SHADE TREES AND THEIR INSECT DEFOLIATORS. C. V. RILEY.

(p. 31.) The fact that the caterpillar [of the white-marked tussock moth] makes no effort to conceal itself shows that it enjoys immunity from enemies, and notably from birds. In fact, the American Yellow-billed Cuckoo, the Baltimore Oriole, and the Robin are the only birds which have been observed to feed upon the larvæ.

(p. 62.) All four of these insects [1, elm-leaf beetle, *Galeruca;* 2, bag-worm, *Thyridopteryx;* 3, tussock moth, *Orgyia;* 4, web-worm, *Hyphantria*] have a certain immunity from the attacks of birds—No. 1 by virtue of an offensive odor, No. 2 by the protection of its bag, Nos. 3 and 4 by the protection afforded by the hairs of the caterpillars, which are also mixed into their cocoons. A few native birds we have seen occasionally feed upon Nos. 3 and 4; but the English Sparrow, to which, being emphatically a city bird, we should look for help, has never been known to attack any of them. In fact, we noticed and announced many years ago that in some of the northern cities (as Boston and Philadelphia) the increase of the Orgyia was indirectly a result of the increase of the English Sparrow, which feeds in the breeding season upon smooth worms, less harmful to our trees, and thus gives better opportunity for the rejected Orgyia to increase, a result still further promoted by the habit of driving away the native birds, which the English Sparrow is known to have. The same reasoning will hold true in respect of the Web-worm; and, putting all sentiment aside, we may safely aver that this bird is an impediment rather than an aid in preserving our trees from their worst insect defoliators. There is every reason to believe that the Bag-worm is carried, when young, from tree to tree upon the claws and legs of the bird, and its dissemination is thus aided and its destruction rendered more difficult; while the yellow suspended cocoons of the *Meteorus hyphantriæ* (the most important of the parasites of the Web-worm) are sought by the Sparrow, probably being mistaken for grains of wheat.

While our feathered friends, owing to the Sparrow's pugnacity, are now things of the past, and can only be seen in the spring when they pass through the cities in their migrations to more peaceable nesting places, yet something might be done to encourage their stay. Nesting places might be provided for them not alone by bird boxes, which, good in themselves, are at once occupied by the English Sparrow; they must be afforded safer and natural quarters.

[Essay read September 4, 1879, before the West Chester (Pa.) Microscopical Society, by the secretary, Dr. B. H. Warren.]

These birds since their introduction in our county (Chester) have elicited considerable interest and comment. In answer to the common interrogatory: Are the Sparrows injurious or beneficial to the agriculturist? the following facts are submitted, as observed by the writer since the transition of the little foreigners.

The autopsies of seventy-five Sparrows, made in 1878, revealed in seventy-three grain and vegetable material solely. Each of the other two had in its stomach, which was distended with wheat, a coleopterous insect (beetle). By this series of examinations it will be seen that only two seventy-fifths of the birds dissected had any insect food, and that in a minimum proportion.

The vegetable material referred to was buds and blossoms of the grape-vine, the plum, pear, peach, and haw trees; also some little grass and a few of the earlier annual plants.

For wheat they have a great predilection, as receptacles of sixty odd contained only that cereal. Oats, corn, rye, clover, timothy, and other seeds variously enter into their bill of fare. As some have claimed that said Sparrow is granivorous only in winter, when in order to sustain existence he is obliged to live on a grain diet, I have, during the months of March, April, May, and June of the present year, examined fifty specimens, of which number forty-seven showed cereal and vegetable food, and one contained a *single* coleopterous insect in conjunction with an abundance of wheat The food receptacles of the two remaining birds were void of any nutritious matter. . . . In reference to their distribution, I think it can safely be said they are in by far the greater part of the towns and villages of our county. In West Chester, and a radius of five or eight miles, they are found in numbers. Sparrows in the late summer, fall, and winter congregate in large parties.

Prior to the gathering in of the crops, these birds do a vast deal of damage to the grains. The sweet or sugar corn, so valued on account of its esculent properties, likewise satisfies these gormandizing omnivores. They will visit a corn-field, alight on the ears, tear open the top of the husk, and luxuriate on the half-formed milky grain. The remaining portions of the ears are left partially nude and necessarily subject to the ravages of insects and atmospheric changes, which frequently result in their complete destruction.

Although considerable damage is done to corn in the way above described, yet the destruction done wheat crops is far in excess. Of course the quantity of grain eaten by each is very small, still the amount sufficient to supply a flock of 500 or 1,000 birds is not inconsiderable. But, gentlemen, bear in mind, if you please, that the grain devoured is but a tithe of that wasted. For instance, a Sparrow lights on a stalk, or possibly will grasp two or more stalks in its claws; the perch, although quite strong enough to sustain the bird's weight, will oscillate from the weight of the foreign body. Such an unsteady resting place compels the bird, in order to sustain its position, to almost continually flap its wings. This, in connection with the violent mandibular action, occasions many pellets of grain for every one eaten to be showered on the ground.

In closing this article, I would earnestly solicit, for the extermination of these "white elephants," the co-operation of the farmer, because to him it is of great practical utility that they be destroyed. To the practical non-closet naturalist, the potent need for their immediate eradication is positive. We ask all lovers of birds—and who among us do not admire, nay love, the native songsters—to lend their aid, and speedily, too, that some means may be devised for the blotting out of this unlooked-for bane.

[Essay read March 18, 1880, by Dr. B. H. Warren, before the West Chester (Pa.) Microscopical Society.]

This much talked of and written about bird I again call your attention to, even at the risk of tiring the patience of some of my hearers. Among our members there are not a few who consider the Sparrow a curse to the community and a bird which, if it ever did do good, has "long since outlived its usefulness."

Some years ago, by a well-disposed, estimable, and well-known resident of this place, six or seven Sparrows were obtained and conveyed to our borough, which at that time was the abode of many native song and insectivorous birds. Their arrival was heralded with joy by our citizens (except a few knowing ones who shook their heads and observed, "You'll be sorry for this in a few years"), some of whom forthwith erected a commodius box in the court-house yard for their protection against inclement weather, mischievous boys, and prowling cats.

The little "pets" (as they were then called) were confined in this convenience and regularly fed and watered by their doting admirers for about ten days, when they were liberated. At irregular intervals after this, for a peried of nearly two months, they returned to the box for food and shelter. Gradually, however, the visitations became fewer and fewer, until finally they ceased. These pioneer Sparrows for several months displayed marked timidity as well as an eagerness to keep secluded. They roosted in the evergreen trees in the court-yard. One or two years rolled on without much *authentic* information being obtained relative to them. By way of explanation it may be stated that the word "authentic" before information is used, not but that it is true many reports, both newspaper and verbal, were current in regard to the "new birds," but the writer is also aware that our migrants and natives, other than the most common and well-known species, such as the wren, catbird, robin, etc., from the size of a sparrow-hawk (*F. sparverius*) to that of a kinglet (*Regulus satrapa* or *calendula*), were denominated by the uninitiated yet loquacious observer, "English Sparrow." After the lapse of the time above specified they were frequently seen in small parties about the borough. Immediately, to meet the needs of these *insectivorous* (?) birds, several of our kind-hearted towns-people built boxes for their benefit. They were soon followed by others, until many of the shade and fruit trees of West Chester were ornamented or disfigured by costly bird-box architecture or rusty tin fruit-cans, pans, and stove-pipes.

These efforts of our citizens, whether rich or poor, high or low, were lauded by the press, and so assiduously were the occupants of said domiciles guarded by night as well as by day that the ubiquitous small boy was put to his utmost to secure the coveted and at that time marketable egg.

The prolific Sparrows, as residents for four years, began to show, even to certain of their supporters, that they were not as useful as it was said they would be.

By degrees it became painfully patent to the fruit-grower, the gardener, and the florist, as well as the practical ornithologist, that the much-cared-for and overrated Sparrows were affecting seriously their respective interests.

The pear, plum, and peach trees, and also the grape-vines, were rifled of their buds. The grapes, strawberries, and, I have been told, raspberries and blackberries, were taken. The tender herbs, grasses, and coleuses were plucked and devoured; and last, but by no means the least, the close-observing lovers of native birds proper were forced to note a steady diminution, not only yearly but monthly, in the formerly plentiful denizens of our town, such as the wren, blue-bird, vireo, and "chippy" (*S. socialis*); even transitory visitors, as certain of the warblers, etc., seemed to avoid West Chester, and now, at the proper seasons, when the migrants as well as residents enter this place, they are pursued and driven out by the hosts of "usurpers."

Our townsman, John F. Ingram, well and favorably known to all, and a gentleman who, it is universally admitted, "thinks twice before he speaks," was one of the first to call my attention to the destructive propensities, uncleanly habits, and pugnacious disposition of the Sparrow. He also had noticed the material lessening in visitations of the insect-eating birds.

Like observations of other well-known parties, and disparaging newspaper reports, linked with a desire to learn the true state of affairs, led to a series of dissections by the writer. The result of this work, it will be remembered by some, was given in detail by me before this society, hence I deem it not necessary to here dwell upon the minutiæ of anatomical labors; but will state that in upwards of a hundred stomachs lately examined the show of vegetable materials was very greatly in excess of the insect diet.

It is needless, however, to dwell longer upon the merits or demerits of these birds. Suffice it to say that repeated interviews with many of our leading citizens and residents throughout the country prove conclusively that popular sentiment is against them because of their injurious traits. Now, the one question is, how shall we get rid of them?

[From papers read before the Biological Section of the Canadian Institute by W. Brodie.]

THE EUROPEAN SPARROW, PASSER DOMESTICUS.

The food of birds has, of late years, become a very important subject of investigation from an economic as well as a scientific stand-point. Many old and tenaciously held opinions have been quite overthrown.

It has been shown that birds of prey are nearly all beneficial, many of them eminently so. It has also been shown that many birds which were formerly considered entirely beneficial are injurious in some particulars.

The rapid increase of the recently introduced European Sparrow, its adaptability to climatic conditions in Ontario, its food, its driving away of native species, and the general disturbance of bird life in consequence, are subjects which have attracted the attention of ornithologists and elicited some discussion without a very definite settlement of the most important points. This bird may now be said to extend over the whole of Ontario, even over very sparsely settled sections.

During this last summer it has spread from Nipissing along the line of the C. P. R. to the north of Lake Superior, and we need not be surprised to hear that it has survived the forty degrees below zero of Winnipeg. It is generally admitted that it has driven away a few native species from cities, towns, and country villages—species which were taking perhaps rather sparingly to our bustling centers, such as the chipping Sparrow (*Spizella socialis*), bluebird (*Sialia sialis*), house wren (*Troglodytes aëdon*), yellow warbler (*Dendroica æstiva*), cliff swallow (*Petrochelidon lunifrons*), tree swallow (*Tachycineta bicolor*), and a few others. The following extracts from memoranda covering a period of six years, are submitted with a view of contributing something to what we know of the food habits of this bird.

I fancy the grasshopper-eating habit has been acquired since its advent into Ontario. I am not aware of its ever having been noticed before either in Europe or in the United States.

The first record of this habit was by Mr. Bucke, of Ottawa, in 1881, the next by Mrs. Maria Gardner, a lady of this city, in 1884.

The dissections and examinations of stomachs were made with great care, mostly on recently killed birds.

My thanks are due to many who rendered valuable assistance in these researches.

In the spring of 1879, Mr. R. Baigent, artist, of this city, reported Sparrows as eating gooseberry buds in his garden. This, if I mistake not, was published at the time in one of the city dailies.

May 7, 1881.—One specimen collected in city; contents of stomach, broken down vegetable matter, buds of trees.

May 7, 1881.—One specimen collected in York Township; contents of stomach, coleoptera, carabidæ, seeds of red clover.

April 10, 1882.—Five specimens collected in city; contents of stomach, pickings from horse manure, buds of trees.

March 24, 1882.—Sparrows eating maple buds on Berkeley street.

March 25, 1882.—Sparrows eating maple buds all through city.

April 7, 1884.—Sparrows destroying fruiting buds of maple and elm.

April 7, 1884.—One specimen collected in York Township by Mr. Williams; contents of stomach, fruiting buds of trees.

August 20, 1884.—Sparrows pursuing, killing, and eating grasshoppers on Ontario street. By Mrs. Maria Gardner.

September 1, 1884.—For some days a small flock of Sparrows frequented a dense growth of "pig weed" (*Chenopodium album*), growing near to my work-room window. In order to determine what they were doing, I carefully closed the shutters, leaving a small ocular. When the birds came readily within a distance of about a yard, with a glass of about ten diameters I quite clearly saw they were eating *aphides* [plant-lice] with great relish, as though they were treating themselves to a delicious drink. These visits were frequently repeated, affording me many opportunities for observation.

September 20, 1884.—Twenty specimens collected in York Township by Mr. W. Squires; contents of stomachs, very sharp sand, broken grains of oats, in one, six whole; elderberries, seeds of amaranthus, larvæ of geometrid moth three-quarters of an inch long, three larvæ in one crop, coleoptera.

October 31, 1885.—From March 1 to this date two hundred and thirty-seven stomachs have been examined; one hundred and four, or about forty-three per cent., contained insects of several orders.

Of eighty-five stomachs examined from September 1 to September 30, the season of young birds and also the season of migration from the city, sixty-three, or about seventy-four per cent., contained grasshoppers.

March 15, 1886.—Sparrows destroying elm buds on Ontario street. By Mrs. Maria Gardner.

March 20, 1886.—Sparrows destroying fruiting buds of maple and elm trees on Berkeley street.

March 28, 1886.—Sparrows destroying maple buds on Berkeley street.

March 29, 1886.—Sparrows eating maple buds on Ontario street. By Mrs. Maria Gardner.

April 5, 1886.—Sparrows eating elm buds.

April 12, 1886.—Sparrows eating maple buds on Ontario street. By Mrs. Maria Gardner.

April 21.—Sparrows eating maple buds on Elizabeth street and Queen's Park. By Mr. W. Parks.

August 15, 1886.—Sparrows pursuing "flying grasshoppers," *Œ. carolina,* on Church street. By Mrs. Maria Gardner.

August 20, 1886.—Three specimens collected in York Township by Mr. Jas. Milne; stomachs contained road pickings, broken oats, fragments of grasshoppers.

August 25, 1886.—Seven specimens, young, collected on Don Flats, north of Winchester street bridge; contents of stomachs, road pickings, broken oats, seeds of *Polygonum aviculare;* grasshoppers in all.

August 27, 1886.—Five specimens collected by Mr. W. Squires, east of city; contents of stomachs, very sharp sand; in all broken-down vegetable matter; in one, head and femora of *C. femur-rubrum.*

August 29, 1886.—Four specimens, all young, collected by Mr. C. Armstrong in Rosedale; contents of stomachs in all broken-down vegetable matter and portions of *C. femur-rubrum.*

September 3, 1886.—Nine specimens collected on Don Flats, near paper mill; three stomachs contained fragments of grasshoppers, two contained pupæ of a dipter, one contained three small lepidopterous larvæ.

September 13, 1886.—Fifteen specimens collected in York Township; all contained the usual broken-down vegetable matter, nine contained portions of grasshoppers, one contained portions of femora of *Œ. carolina.*

Of the forty-three specimens collected from August 20 to September 13, twenty-seven, or nearly sixty-three per cent., had been eating grasshoppers.

May 27, 1887.—A young Sparrow about a week old fell out of nest and was killed; stomach contained fragments of eggshell, two spiders, one small moth denuded of wings; the head and antennæ were fairly well preserved.

July 17.—Saw two Sparrows pursuing *Œ. carolina* on Berkeley street. When the grasshopper alighted the Sparrows pounced on him, but he eluded them by darting up on wing, the Sparrows sitting still watching his down-coming. Four unsuccessful attacks were made. On the fifth mount he got into some shrubbery and escaped.

July 19.—Mrs. Maria Gardner handed me a mutilated *Œ. carolina* over which two Sparrows were contending in the normal school grounds; the head, both elytra, one wing, and three legs were gone and the thorax was badly crushed.

July 20, 1887.—About noon saw a Sparrow breaking legs and wings of *C. femur-rubrum* in front of 325 Parliament street.

July 20, 1887.—Saw a Sparrow catch and denude of wings and legs a *C. femur-rubrum* on Berkeley street, and then fly away with it, apparently to nest.

August 5, 1887.—Caught four specimens of *C. bivittatus* on Don Flats, liberated them on a patch of *Polygonum aviculare,* Berkeley street, much frequented by Sparrows. They were immediately attacked by about a dozen Sparrows, and within fifteen minutes three were killed, torn to pieces, and devoured.

August 11, 1887.—Two specimens collected by Mr. W. Squires, in the east of the city; contents of stomachs in both, road pickings and broken oats; in one, three pupæ of a dipter.

August 31.—Five specimens collected by Mr. D. Cox outside city limits; three stomachs contained spiders and fragments of coleoptera; one, head and femora of *C. femur-rubrum.*

September 12, 1887.—Two specimens collected in city; contents of stomach, small pieces of egg-shell, road pickings, broken oats.

September 20, 1887.—Four specimens collected on Don Flats, near paper mill; stomachs all contained small lepidopterous larvæ and fragments of grasshoppers.

Of the three hundred and seven specimens collected from May 7, 1881, to September 20, 1887, the stomachs of one hundred and thirty-two, or nearly forty-three per cent., contained insects of several orders, and eighty-five, or nearly twenty-seven per cent., contained grasshoppers of two species, *C. femur-rubrum* and *Œ. carolina.* These two, with *C. bivittatus,* on which I fed them on August 5, 1887, make three species on which the Sparrows feed in the neighborhood of Toronto.

TESTIMONY RELATING MAINLY TO THE SPARROW IN EUROPE.

FROM THE EVIDENCE SUBMITTED TO THE SELECT COMMITTEE ON [BRITISH] WILD BIRDS PROTECTION. 1873.

[Mr. Champion Russell, residence near Romford.]

[Page 12.] I will give you a history of the course of his life the whole of the year round in the country. We will begin on the 1st of January. He lives in the farm-yards, along the roads, yards of any kind near the houses. He gets his food there; when the stacks have been threshed, in he goes. As soon as the barley and oats are sown he leaves the farm-yards and houses, and you see very few there. If you shoot him in the fields you find his crop full of oats and barley, unless he can get wheat; then from that time until after the seed corn has grown, which would be about the end of April (it depends on the season), through May and June, when he can get the least corn,* then he destroys insects; the old ones eat scarcely any even at this time, but they feed their young more or less with them. Then when the green peas are in pod, that is about the first thing he takes in the fields. At this time of the year you may go miles across the country without seeing a Sparrow in the fields at all, except near houses and roads. I never see a Sparrow elsewhere until the peas are in pod. The next is the oats and barley, when they begin to get milky, and the next thing is the wheat. They get more and more in the fields in flocks, and there they stop, living principally in the fields, and many of them sleeping out in the hedges, until all the waste corn on the ground has grown in October. Then they come in clouds round the stacks, and then they go back to their old occupation, picking up what they can among the fowls and pigs and on the roads. The chief mischief they do is eating the green wheat in the ear when the corn just begins to form and there is very little in it. An intelligent farmer told me lately that he sometimes loses £15 or £20 a year on a field, and that he would give £20 a year to keep them out; he lives near a village.

This is done particularly in the first half of July, when the grain is imperfect; the juice runs out of their mouths when shot; you would think they had been drinking milk. Some farmers in Norfolk sow a little strip of oats between the farm-yard and the wheat-field that they may attack them first. But the great objection which I have to the Sparrows is, that they are by their increasing numbers exterminating the martins. They have a habit of dispossessing the martins of their nests, and in our part of the country the martins have almost disappeared; consequently, we are subject to a plague of flies and insects; the Sparrows are the best allies of flying insects.

I see an attempt to dispossess the martins on an average about twice a week when I am at home; and once or twice I have seen it two or three times in a day. The martins' nests are under the eaves. The cock Sparrow comes first and settles on the eaves, and dodges about; the martins make feeble attempts to drive them away, but they are usually perfectly helpless; the Sparrow dodges backward and forward perhaps for an hour; at last he gets in, and once into the nest the cock stops in and keeps the martins out with his sharp bill, while the hen brings some hay. The Sparrow once in full possession the martins never meddle. They spend the whole of the summer in building fresh nests for the Sparrows.

I never knew that they dispossessed any other bird.

I never knew any other bird dispossess the martins.

The Sparrows come in clouds round the stacks when they can get no more out of the fields, and they then take to the same mode of life that we began with, except that they have a turn at the wheat in the fields when it is sowed about November. The stacks being threshed out in the fields has made a difference to them; they used to thresh them out in the farm-yard, where they had a struggle with the pigs and fowls. Close to my gate at home, though not on my own land, a stack was threshed out in April or March; it has furnished clouds of Sparrows with food ever since; people have been moving the straw occasionally, which gives them fresh ground to feed upon; these things encourage Sparrows; besides which, I believe there are more horses in the country and more oats given them, and that is a never-failing resource; they will never starve, winter or summer, so long as horses have uncrushed oats.

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* [It should be remembered that the word corn is used in England to denote small grain of almost any kind; Indian corn is invariably called maize.—W. B. B.]

They give their young ones insects. I have saved the food of many hundreds of Sparrows, and got it bottled [producing two bottles], that I may know precisely what kinds of insects they eat. I should also like to know what species the martins eat. I want the assistance of an expert entomologist here, but I can state generally that out of three hundred and eighty-eight young Sparrows examined last year, of all ages, from a great variety of places, chiefly from farms, but also from private houses, wheat and green peas were found in them in considerable quantities; the insects were of two classes—caterpillars and coleopterous insects—but I found very few insects that I knew well; I found one earwig, one grasshopper, a few hard-winged beetles, but mostly soft beetles (I suspect they come out of the manure), and caterpillars in very variable quantities; the very small young ones, up to three or four days old, generally have caterpillars and little else, unless they have green peas. When they get to the size of "large callow," you will often find that they are full of wheat; the gizzard soon becomes hardened, and there is a great quantity of even ripe wheat. Sometimes you find hardly any caterpillars, but a kind of black stuff. There are different-sized insects of the beetle class, but soft. I find a great quantity of coleopterous insects also in the droppings under the martins' nests; not the same species probably, but the same class of insects. One catches them on the wing, whereas the others catch them on the ground. One of these bottles holds the contents of the stomachs of eighty-two young Sparrows taken recently, and this one of fifty-four old Sparrows obtained last April; of more than one hundred examined at different times in that month, only one contained an insect; that one, two or three. I have not yet found an insect in a Sparrow in autumn or winter. They can hardly do much good to the farmer, for they do not frequent the fields to eat the insects unless they are close to a house or road. You can see them destroy an acre of wheat sometimes, but I am not aware of any counterbalancing advantage in the ground close to the roads and the houses over places half a mile from a road or house where you never see a Sparrow except about harvest time.

The food differs very much, according to locality and according to the opportunities. A farmer sent me a lot of young Sparrows, that I might examine the contents of their stomachs; they contained a good deal of wheat, a good deal of green peas, and a fair sprinkling of insects. Only four days later he sent me another lot; there was still wheat, but no peas—insects were substituted; they were caterpillars. I suppose the green peas had been grubbed up, and they had to hunt the caterpillars; but it was not very conclusive, because the man had two farms a mile apart. He told me that he believed they came from both farms; but that made it a little less pointed than it would have been. I could not get at it by inquiry; I did not get to see the boy who took them, but it looked as if they ate peas as long as they could get them, and then they got caterpillars. You will find that there are more caterpillars at the top than at the bottom of this bottle, because the contents of the youngest birds are at the top.

I do not know how many days after hatching the young begin to eat wheat; when I was a boy I might have been able to tell you how many days each size of callow bird represented. What I call a large callow bird generally contains a good deal of wheat. I should say three days old is the date, but it is a mere guess. As their whole growth is completed in a fortnight, it can not take many days. The large callow birds contain more food than the full-feathered ones; the gizzard alters very curiously in shape and size, and as they grow to full size it contracts again. As to breeding, I can not tell exactly, but my recollection of the time when I used to look after nests is that they seldom lay before about the 23d or 25th of April. They breed all through July and August, but you do not find many then; as they get out onto the wheat fields they seem to leave off the idea of breeding; there are not many nests in August; that is the only chance the martins have, which saves them from utter extermination. Occasionally they raise a late brood in September, when the Sparrows are gone to ravage the wheat fields. The poor birds are reduced to great straits, and they have to wait until the latter part of October, when they are pinched up with the cold, and they go down the chimneys at night for warmth; but when they are protected they get their latest broods clear off before the end of September generally. To the best of my recollection only two nests were reared (on my place) in 1869, one close to a door, and one close to a window, where the Sparrows dared not come; all the rest were taken by the Sparrows. As, to my indignation, they had been diminishing in numbers for many years, I thought to do something to protect the martins. I had been away from home for a month in the year 1870, and I came home towards the end of May. Several martins' nests were built around the pigeon-house, which is a favorite place of theirs; I found that every nest had been taken by the Sparrows. I set to work with a young friend, one or other of us watching the martins nearly all day for a fortnight; we killed about a hundred and fifty Sparrows in the fortnight around the martins' nests, and in spite of a great deal of difficulty, we got seven nests to fly that year. The next year I had twenty nests; last year I had forty-five, and this year I have more than fifty, I should think; I can not tell exactly how many there will be, but I expect there will be sixty, for I believe there are fifty-one now, and they have not all built yet. * * * No bird, in my opinion, does as much mischief as the Sparrow, or requires so much to be kept down, partly from the nature of his food and from the manner of getting it. The Sparrow is not only the greatest corn-eater, on the whole, of any of the small birds, at all events, but he is not kept down by a cold winter so much; he can find his food somehow all the year round. No small bird approaches the Sparrow in destructiveness; I will not be so dogmatic as to say that the Sparrows are of no good at all, but the balance is against them, even taking a comparative estimate of what they eat; and when you are certain that they are destroying one of our most beautiful, useful, and interesting birds, the martin, that condemns them. I like the martin, and his enemies are my enemies. (June 12, 1873.)

[Mr. Champion Russell, in paper handed to the committee.]

[Page 172.] Mr. Hurrell, farmer, Boreham, near Chelmsford, being questioned (July 14, 1873) about birds, says that he once measured an acre of early wheat where Sparrows had eaten it, and another adjoining acre, otherwise of same quality. The wheat was thrashed out separately, and the loss from Sparrows found to be two quarters [16 bushels]; value at the time, £6. Does not find the land less valuable for any crop where Sparrows do not frequent. Says that Sparrows take a few aphides from the peas, as well as the green peas themselves, but not enough to do perceptible good where they frequent.

(I find that they sometimes give a few aphides to their young ones.—C. R.)

Martins and Sparrows.*

The decrease in the number of straw-thatched buildings, most likely, has some effect in making Sparrows more hard on the martins; but many of the former take the nests of the latter in preference to any other accommodation. I have found, for instance, that they will not use the "Sparrow pots" if they can get at martins' nests.

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* [The European martin, *Hirundo urbica,* must not be confounded with the American martin, *Progne subis.* The former is much smaller, in size and nesting habits more nearly resembling the American cliff swallow, *Petrochelidon lunifrons.*—W. B.B.]

The time that Sparrows prefer to take martins' nests is when the shell is not quite finished, as they like a rather large hole to carry in their grass and feathers, of which they use much more than the martins. If not molested, martins use the same nest if they have two or more broods. If the Sparrows do not take a martin's nest before the young ones are large, they do not meddle with it until the first brood has flown. This, then, is another favorite time for taking the nest. The old martins are away attending to their fresh flown young for a few days, and there is no attempt at opposition. I think I could find within a short distance one hundred houses where martins built in numbers forty years ago, but where, owing to the depredations of Sparrows and stupid people, there are none now.

White, of Selbourne, wrote that "there are few towns or large villages but what abound with house martins." This was the case up to some forty years ago. Now, in most towns and villages, where there were hundreds of these birds, there are now none, or only a few pairs. The principal exceptions, in my knowledge, are in moor or down country, where there is little corn, and consequently but few Sparrows. Sometimes, but not often, the martins find a place to build, which, for some reason, the Sparrows do not like.

If people will neither protect the martins from the Sparrows, nor let them build near their doors and windows for protection, we shall lose these beautiful and most useful birds; indeed, we are losing them fast. Unlike most other birds, they will not make their nests far from our dwellings; if not allowed to build there, they disappear.

Any law to protect Sparrows, if at all observed, would have precisely the same effect as offering a reward for the destruction of martins.

As a single instance among many of the banishment of martins by Sparrows, at the place where I was born and brought up, three miles off, there were a great many martins nests when I was a boy. The Sparrows persecuted them badly then, and gradually displaced them, until, for some years past, I do not think that a brood has been raised there. It is a favorite place for martins; some always resort and feed there, though none breed within three-quarters of a mile. They constantly try to re-establish themselves there. This year two nests were begun. Both were taken by Sparrows before they were finished. A starling afterwards turned the Sparrow out of one, and eventually broke the nest down by its weight. A starling's egg was found in the nest after it fell.

To recover from the martins the other nest, which was under the eaves of the house, near a window, I offered a servant half a crown to shoot the Sparrows and pull their nest out. This was done. The martins came back, finished their nest, and kept possession for some time. When the young ones were callow, half of the nest, with its contents, was found one day on the ground. The Sparrows no doubt caused this mischief by trying to force themselves into the very small hole left by the martins as is their custom where liable to the attacks of Sparrows. The nest rested on a bar of iron, and was broken across the middle ; a thing I never knew to be done by the martins themselves ; no wet could get at the nest. I have before known a nest to be broken by Sparrows squeezing themselves in; in this way they often break down a nest entirely and then go and take another.

Three years ago a blacksmith near here saw two Sparrows pull young martins out of a nest and drop them alive on the ground. He got a ladder and put the birds back in their nest; in ten minutes he found that the Sparrows had come back and thrown down the young martins again.

[Page 174] I have destroyed Sparrows as closely as possible for the last four years, and can not find the slightest disadvantage from their absence. It may be said that my neighbors supply me with enough for useful purposes. If so, this shows that 99 per cent. of their usual numbers might be destroyed without perceptibly bad effect, so rarely is one to be seen at my place.

[Page 182.] The House Sparrow stands in a class alone; it can hardly be considered a wild bird; it is a parasite, living mainly on our produce. Its mode of life is such, that it requires to be kept down by man far more than any other bird.

Sparrows should have no protection by law; they are bred in great numbers in towns, villages, and about almost every house and cottage. Living along the roads, they soon find their way to and swarm in farm-yards, however closely they may have been killed down there in winter and spring. Farmers, therefore, generally have the nests taken, but many escape in trees. Were this practice prevented, poisoning would be thought necessary.

Much has been written in favor of the "Sparrows and other small birds." One consequence is, that many people encourage Sparrows to an extent detrimental to their neighbors' crops and to the martins; another consequence is, that others, finding the Sparrows destructive, and taking it for granted that all small birds are alike, destroy all they can. Then, Sparrows being far more wary and cunning, before they are thinned to any extent almost all the other birds are destroyed.

Nearly all evidence in favor of Sparrows is founded on partial observation, or is vitiated by the fact that when they are killed down the other birds are exterminated. The destruction of Sparrows by nets, and particularly by shooting, is almost always accompanied by great slaughter of harmless and useful birds. Warblers and other soft-billed birds are much more effective destroyers of caterpillars and other insects than Sparrows.

One great object of protection laws is to educate people to spare harmless birds. One of the first practical steps toward this desirable end is to teach people that, when it is necessary to thin the Sparrows, other birds need not also be destroyed. The indiscriminate zeal which would protect all birds alike, defeats its own object and spoils a good cause by going too far.

The moral effect of any legal protection to Sparrows, even if not applied to occupiers, would be to keep up the delusion that all small birds are alike, and thus to encourage the slaughter of harmless and useful birds with the Sparrows.

Whatever may be thought about the utility of a moderate number of Sparrows, few practical farmers doubt that in great numbers they are very destructive; it seems to me that there is no fear that we shall ever have too few of them; in spite of all efforts to destroy them, they seem almost everywhere to be greatly increasing in numbers.

[Mr. Henry Meyers, market gardener.]

[Page 20.] I had a Sparrow club once; I thought they were very injurious birds; we killed them until scarcely one could be found on the premises. After the Sparrows became almost extinct we found blight of various kinds very much increase upon us, and it has done so ever since. I am glad to say Sparrows are becoming more common with us now; this year our trees are comparatively free from blight. The committee will draw their own inference, but those were the facts. We have also suffered much less from insects, especially this year. To say the Sparrows do no damage would be wrong, but there is no doubt that they do a larger proportion of good than they do harm. I can not say that I have gone into details, and made *post-mortem* examinations of their stomachs, but there is something interesting in one of those bottles I think. (Bottles produced by last witness.) You will find the larva of one of the greatest enemies we have—the little green caterpillar that eats up the gooseberry leaves. We are large growers of gooseberries. The Sparrows will sometimes have their share, and go and pick off the ends of the blossoms, but they do that over a very small extent of our plantation near the buildings and near the hedges. My foreman at Bedfont said, "These Sparrows are stuffing at the gooseberries; what shall we do?" I said, "Let them alone; they will go to another place soon." We have now a very good crop of gooseberries. I think the amount of fruit which we lose from the birds is comparatively very small indeed. What I mean to be understood by this is, that for ten months these birds are living very much on what they can get, such as seeds of weeds, self-set corn, and vermin. I have no doubt (although I can not prove it) that the germs of blight are consumed in winter by small birds, and if they were more common, blight would be less common.

[The following points were brought out by questioning this witness]:

With regard to the blight, it was an increase of blight generally. I can not say as a consequence of the destruction of the Sparrows. I only mentioned that as a coincidence; the green caterpillar in the gooseberries was one, and the common caterpillar in the apple trees. I have had apple trees destroyed by them for two years. I have had the green fly in almost all kinds of plants; the only thing that has not suffered has been the raspberries. * * * I have not seen Sparrows actually eating the green caterpillars off the gooseberry trees. * * * In addition to the Sparrows I destroyed the chaffinch and any kind of seed-eating bird, but not blackbirds and thrushes. (June 12, 1873.)

[Mr. Lewis Fytche, magistrate.]

[Page 25.] I have observed Sparrows all my life and I will at least say this, that if you watch the Sparrow you will see one of the most beautiful sights in creation; that is to say, a cock Sparrow, hawking at the white butterfly in the sun. He goes at it just like a hawk after a heron. He kills tens of thousands of the eggs which produce the cabbage caterpillar; so that instead of taking the caterpillar he takes the evil in the egg. The white butterfly produces the cabbage larva which does so much harm, and I think the Sparrow is most useful in that point of view. (June 12, 1873.)

[Lord Lilford.]

[Page 28.] The Sparrow is mischievous in every way, and is very numerous. Of course he does good by destroying grubs and caterpillars; but I think he does decidedly more harm than good. (June 19, 1873.)

[Prof. Alfred Newton, M. A., F. R. S.]

[Page 34.] The Sparrow has spread throughout the world, accompanying man in his migrations; he has taken him out to the United States, the Cape of Good Hope, the Island of Mauritius, Australia, and almost every part of the world. * * * In a few years I think some of them will find out their mistake. * * * I think certainly the Sparrow will establish himself, and perhaps any bird that establishes himself must do so more or less at the expense of some other bird. (June 19, 1873.)

[Mr. C. O. Groome Napier, ornithologist.]

[Page 47.] I think the Sparrow and wood pigeon are the most objectionable birds we have, on account of their numbers and also because they feed so much, generally on green crops. I think the Sparrow does more harm than good. The balance is decidedly against him; I should condemn him. He does not feed his young entirely on insects even during the first days. Dr. Edward Crisp exhibited before the British Association at Birmingham, in 1865, a hundred stomachs of young Sparrows, and there was not 5 per cent. that contained any insect food; I examined them with a lens myself. They were the stomachs of nestlings. The food is almost always a considerable portion of grain; in the case of young Sparrows it is green corn generally. I know from personal observation that the Sparrow takes the place of other and better birds; I have observed that the warblers and wrens, and those little birds, have been pushed out of their proper position by the Sparrow. They have been driven away from the locality. The Sparrow supplants them in their nesting places. I have seen the Sparrow often supplant both the house martin and the swallow. I once had a swallow's nest which was usurped after there were eggs in it by a Sparrow; the Sparrow put in some hay to make the nest rather softer. I believe the Sparrow ate the eggs; they were found broken, at all events, and covered with hay. (June 19, 1873.)

[Mr. Alfred Ellis (living near Leicester).]

[Page 52.] In my neighborhood the House Sparrow is not injurious to any considerable extent, except just when the corn begins to harden, or gets sufficiently formed to enable him to take it from the chaff, then he is very destructive; during the other part of the year he feeds largely on insects. The Sparrows in our neighborhood remain in the fields late in the autumn, much after the gathering in of the harvest, and a long time after there is an ear of corn in the fields; they feed then in large flocks entirely on seeds, the seeds of weeds. I may state that I have seen the Sparrow in contest with the martin for the martin's nest. He drives the martin from his nest to some extent, particularly toward the latter part of the summer. I do not recollect an instance of where a Sparrow dispossessed a martin during the first brood of the martin, but in a large colony of martins I think I have seen as much as 25 per cent. of the nests occupied by Sparrows in the second brood of the martins, or rather what would have been the second brood. I have not observed that other birds are driven away by the Sparrow.

[Mr. Alfred Ellis.]

[Page 56.] The Sparrow is certainly powerful enough to turn out the martin, and he does it. The martin is one of the most useful birds. The Sparrow is mischievous during the time when the corn is first hardening; on the first ripening of the corn you will find the Sparrows constantly in the field up to the time of the gathering in of the harvest, perhaps in the midland counties from the first week in July to the middle or end of October. * * * I do not think the Sparrow does very much harm in the gardens; I have seen destruction caused by it in radish beds and young lettuce beds. (June 26, 1873.)

[Mr. R. Scot-Skirving, gentleman farmer.]

[Page 63.] I would exempt the House Sparrow (from protection); nine-tenths of the House Sparrow's food is insects, particularly caterpillars. As a farmer, I would not be frightened of the damage they do; the damage they do to farmers is much more apparent than real, because they eat corn as it ripens along the hedge-side, generally near the farmsteading; they do not scatter themselves over the fields; they will utterly destroy a quarter of an acre, perhaps, but they will never touch anything else. However, they do terrible damage to gardens; they kill off the very young vegetables when they first come up from the ground; they will eat up a whole crop of peas if they are allowed. I have watched them feeding their young, and I have seen them coming with green caterpillars from the bushes and trees; when they were thought to be doing damage they were killing caterpillars.

[Rev. J. Pemberton Bartlett. Residence at Exbury, in the New Forest.]

[Page 68.] The Sparrow undoubtedly does harm in gardens; he does a certain amount of harm, but if he does harm for three months in the year he does good for the other nine months, which counterbalances it. I have opened the crops of the young and I have watched the old birds carrying green caterpillars up to their nests. I have dissected young birds enough to get a knowledge of what they are fed upon. In the breeding time they are nearly always full of insects, caterpillars, etc. The majority of their food for a certain time is insectivorous. I have sometimes found them without any vegetable food, and at other times there has been a mixture of green food, but the insect food always preponderates decidedly over the vegetable. With regard to the martins, certainly he does drive them away; I had all my martins driven away three years ago by Sparrows. I have known the birds take possession of all their nests, and drive them away. This year the martins have come back again, and the Sparrows have not attacked them yet. (June 26, 1873.)

[Mr. William Johns, book-seller (residence about a mile from Torquay).]

[Page 73.] On June 5 I walked to Babbicombe Hill to wait on a lady; I saw a moth on a flower; I went and took the flower and turned the head down, and the moth flew away. It was not the one I wanted. It flew half across the garden. A bird (Sparrow) came from the hedge, caught it, and took it to its nest. I went to the nest, and there were five of the top wings of the same moth. It was the large brown cabbage moth, one of the greatest enemies of the cabbage plant. (June 26, 1873.)

[Mr. Henry Stevenson, gentleman.]

[Page 89.] I have repeatedly seen the Sparrow taking possession of the martins' nests on the sides of my own house, and I have frequently shot them with a small-bulleted pistol to turn them out. I have never known them to interfere with the swallows' nests, but the Sparrows are in the habit of using old martins' nests in the winter, relining them, and I suppose they think they have a vested right in them the next spring. If the martins build fresh nests they turn them out of those also.

[Page 91.] I suppose I have sometimes seen ten or twelve pairs of Sparrows at a time all collecting insects from the grass and from the borders for their young, which are under the tiles and other parts of the houses; they are doing an immense good at that time, but as soon as those young birds have flown and taken themselves to the fields, then they certainly do a great deal of injury to the farmers. The earlier broods are not fed on grain. Later in the season, when the corn begins to be soft in the ear, I think the probability is that the old ones feed the young on soft, pulpy grain. I have not dissected any Sparrow nestlings.

Speaking only as a gardener, I should not destroy the Sparrow. I think they do me a very great amount of good. (July 3, 1873.)

[Mr. George Swaysland, taxidermist (residence at Brighton).]

[Page 104.] The Sparrow does a great amount of good; he never feeds his young on corn at all; you see him in all the footpaths in the cornfield; he is not in the corn; he feeds his young on insects. I never knew him to feed his later brood on milky grain; I have killed and examined thousands of them—nestling Sparrows; I have generally found grubs in their stomachs, or those little beetles that run across the footpaths. As soon as the old bird leaves the young Sparrow then he goes to the corn; but they bring their young ones up on insects until they are able to fly about and to look out for themselves. Those things have been my study all my life. I know whether birds increase or decrease, and what they feed upon; it has been my hobby; I have been more in the fields, and I can say it without any boasting, I have lost more time, as some people would say, in the fields, than any other man in Great Britain. (July 10, 1873.)

[Mr. John Cordeaux, gentleman farmer (residence in North Lincolnshire).]

[Page 110.] My opinion is that the good the Sparrow does far counterbalances the evil. The time of year when the Sparrow commits the most destruction is when the young milky grain is in the plant. Two or three years ago I opened the crops of thirty-five young Sparrows of various ages, which I took indiscriminately from the nests around my own house, and on an average I found in their crops two parts soft grain and one part insects; so that even at this season they feed partly on insects. Some of them were only a few hours out of the shell, but others were fully fledged; they were every size and age. I never destroy Sparrows except in taking their nests, and I do that because I think the Sparrows increase enormously, and I think they drive out other birds. Sparrows about a garden discourage the warblers and other birds. I find when there are a great number of Sparrows, one species turns the other out. It is by competition for food. * * * I have never seen a case of actual persecution, but being a strong and pushing species the Sparrow would naturally eat the food of weaker and less combative birds. (July 10, 1873.)

[Mr. John Cordeaux in paper handed in to the committee.]

[Page 178.] House Sparrow (*Passer domesticus*).—Sparrows feed their young in April, May, and June almost exclusively on insects; in July, insects and soft grain. "The stomachs of thirty-five young Sparrows, taken to-day from nests about my house, give the following result: One part insects to two parts soft grain. The young were of all sizes, from a day old to others sufficiently fledged to fly short distances; some had the stomach filled almost entirely with insects, and others with grain alone; generally, however, there was an admixture in the above proportions. The grain was not confined to the oldest birds, as the stomachs of two baby Sparrows, from appearances hatched but a few hours, contained nothing but grain. One little bird had its gizzard filled with a large moth, which unfolded was half the size of its body. Where grain was present there was also a proportionate supply of small stones to assist digestion. Those gizzards containing the largest proportion of grain had invariably the most stones. The insect remains were principally those of various coleoptera and many small caterpillars and grubs." (J. Cordeaux, in "Zoologist" for 1870, p. 2287.) The Sparrow also feeds on the aphides and the weevil of the bean plant; in the autumn and winter, on grains of wheat, oats, and barley; also various seeds.

[Mr. William Cratie Angus, picture dealer (residence in Glasgow, but notes relate to Aberdeenshire).]

[Page 117.] Sparrows by the end of June or beginning of July congregate into large flocks, and I have known fields of barley and corn flattened by them, actually broken down by the weight of Sparrows; they are very destructive to newly-sprouted peas; I have known whole rows of peas cropped off by Sparrows. * * * When they have bent down the corn it has been on the edge of the field generally, not always. The earliest part of a field is not necessarily the edge of it. They generally go to the earliest part of it, but, when disturbed, prefer the middle to the edge of it. I have shot (firing both barrels) as many as seventy Sparrows feeding in the middle of a field. Whether they feed in the middle or on the edge of the field depends, I think, on the ripeness of the crop and the amount of annoyance they would be subjected to at the edge. I think that wherever any species becomes very numerous, by force of numbers it dispossesses other species. Where Sparrows are very numerous in gardens you will find that other birds are not so plentiful. (July 10, 1873.)

[Rev. John George Wood, F. L. S.]

[Page 131.] I have not done very much with the Sparrow, but I have seen him in the very early morning doing nothing but eating insects or larvæ, picking them out of the grass, the daddy-long-legs especially, which is one of the most dangerous insects we have. It never struck me that the Sparrow displaced other birds. I think there is no competition for food. (July 17, 1873.)

[Mr. James Pertwee, gentleman farmer, residence in Essex.]

[Page 149.] I can hardly describe the harm the Sparrow does me; he does harm in every possible way. He is utterly bad; he is no good either; he is not to be frightened at all. He may do some good for a day or two while the birds are very small, but directly he can get soft corn or seed he will take it to his young. They are troublesome birds in every way; for instance, they destroy the thatch of buildings at an astonishing rate. They make holes in the thatch, and they turn out all the martins. I should not mind giving £5 a year to be protected from them. They turn martins out of their nests; that is a very useful bird; but they have decreased very much through the Sparrows. I do not think I have known the Sparrow to persecute any other bird besides the martin. This year, I am sorry to say, I have no martins' nests, or only one; sometimes I have had a number under my eaves. The Sparrows would take every nest they could get if I had not looked after them and kept them away as well as I could. They turn them out sometimes when the nest is half formed, like a cup, and sometimes when they have had young ones they have turned them out. I have found the young ones thrown out and lying on the ground.

I may add that some persons have said that the Sparrows do good inasmuch as they eat green caterpillars off gooseberry and currant trees. Now, my children told me yesterday that the caterpillars had eaten up all the currant trees. My garden joins the farm-yard, and there are plenty of Sparrows in the garden, so I do not see that they eat the caterpillars at all. (July 17, 1873.)

[Mr. James Pertwee in paper handed in to the committee.]

[Page 175.] House Sparrows.—It is scarcely possible to say too much against these obnoxious birds; they live almost entirely upon corn, and will not take insects, grub or caterpillar, except when their young are very small; begin to attack the corn before any other bird, and give their young green peas, barley, and wheat as soon as the kernel is formed; do not even eat seeds of weeds or plants, because they are not found in the fields, except when and after there is corn. I would give £5 a year to be protected entirely against them. At this time my gooseberry trees are infested with caterpillars, although the garden is very near to the farm-yard, and a gentleman told me on Tuesday last that his garden joined the stack-yard, yet the green caterpillar was stripping the leaves off his gooseberry trees.

[Mr. James Harrison, gardener and bailiff (residence at Heathlands, Hampstead).]

[Page 152.] The Sparrow is a very good insect-catcher at certain seasons, when he eats caterpillars. The only trouble that gardeners have with him is at the time young peas are in season. Then he is inclined to take too much, and only then. I have never destroyed a bird during the twenty years that I have had charge of gardens; and I would not destroy even the Sparrow. (July 17, 1873.)

[Mr. John Colam, secretary Royal Society for Prevention of Cruelty to Animals.]

[Page 154.] With regard to the Sparrow, I have often seen him devouring large caterpillars, and this very day I have seen a Sparrow attacking spiders in a most voracious manner, and clearing them off the copings of the walls at Wandsworth. (July 17, 1873.)

[Mr. Jesse Willard, gardener to Lady Burdett-Coutts.]

[Page 155.] I know for a fact that the common House Sparrow eats caterpillars, for I can give an instance of that. The cottage I live in is covered with ivy, and against the bed-room window is a Sparrow's nest with young ones in it. I have seen the old Sparrows come in the morning from some pear trees opposite, and alight on the window-sill with caterpillars in their mouths. You could see them quite plainly. I should say in passing, that instances have come under my notice in which, where the caterpillars have been rather numerous, they have been passed almost unnoticed by other birds, and all at once the Sparrow has made a sudden set at them and cleared them off. I recently had a brother of mine come up from the country; he lives in the Weald of Kent, where they grow a great many filberts; he was not favorable to birds, on the whole, but he said this fact had come under his notice: They had some filberts on which there was a large amount of caterpillars; all at once the Sparrows set at them and cleared them off; at the same time, for some reason or other, they seemed to pass them by for a time quite regardless, but all at once they set at them. I have seen that apparent caprice myself. (July 17, 1873.)

[Mr. James Bell, gardener to the Duke of Wellington, Strathfieldsaye, Hampshire.]

[Page 156.] I have seen a wren carrying green caterpillars off the fruit trees all day long to her young ones. I have seen a Sparrow going on just in the same way as the wren, only the Sparrow's family is not so numerous as the wren's. The only thing which I know against the Sparrow is that after the peas come in just about this season, they are very destructive to the green peas; they peck the pods, and destroy the peas. * * * But notwithstanding the destruction of a few peas, I think the Sparrows are of very great advantage to gardeners. (July 17, 1873.)

[Rev. Francis O. Morris.]

[Page 164.] This is the twentieth year I have been rector of Nunburnholme, and in the whole of that time I have never but twice, at intervals, known the Sparrows do me any harm that I should not feel ashamed to complain of. They used to breed in great numbers in our dilapidated old church; and those two years did certainly take the peas in my top garden in a way I did not approve of. But they never did so before or since to any extent worth speaking of, and I always say, "Live, and let live." They do sometimes pick up garden seeds, when sown close to the surface, but I believe are much oftener blamed than they deserve, for what the mice have done. The rows of peas in the garden * * * are this year almost as perfect and full as it is possible to be, though it is on that side that the church tower still affords a home to some of those birds, as do also some large ivy-covered birch trees, while in the other garden, out of their way, there are some gaps, but not much to speak of even there, from whatever cause.

It is really the fact that I very seldom see the Sparrows eating anything, and I often have wondered what they get to keep themselves in such good condition. I hardly ever go on the road, all the year round, but I see many in the middle of it, here or there; and when they are down in the garden, they are generally on beds where there is nothing but grains of earth or sand to pick up. This year they have picked off the young leaves of the beet-root in one of our gardens, but I hope the plants will be none the worse for it in the end. In the other gardens they have not touched them at all.

With regard to the Sparrow being the cause of the diminution in the numbers of martins, I have to remark that the two species have gone on together, *pari passu*, in all time past. If, then, the latter have been, within the last few years, as is suggested, expelled by the former, how is it that the like was not done before? How came the martins to hold their own in such numbers till then?

This house and the old church near it used to be lined with martins' nests years ago. Since then, we have had none till this year, when first one pair built, another began, but left off; yet some half-dozen pairs are careering morning after morning in front of my study-window, but nothing has come of it so far. (Since I wrote this several other nests have been built, and one begun.)

We used to have, too, contemporaneously with them, a cloud of Sparrows in the old church roof and tower; and no doubt they sometimes expelled the martins from their nests. But these were only the exceptions, and the main body held their own against all comers. Even those which are now and then dislodged, build over and over again; the cause, in such cases, of their being late, or over late at the time of migration.

This year, as I said, three or four pair only are building here, while of some which are building again in the village, most, or nearly all, are domiciling without molestation under the eaves of a farm-house adjoining a fold-yard, the very home of the Sparrows, and at some cottages immediately opposite to the adjoining stack-yard.

[Mr. Robert Gray, ornithologist, and late secretary Natural History Society of Glasgow.]

[Page 176.] The Sparrow is very destructive to grain and is able to protect itself. It may, therefore, with advantage, be excluded from protection.

[Mr. J. E. Harting.]

[Page 186.] The Sparrow, although a consumer of grain, feeds itself and young on insects for many weeks at a time when insects are most injurious.

It therefore deserves protection during the nesting season, or from April 1 to August 1.

[FROM "THE HOUSE SPARROW" (PART 1), BY J. H. GURNEY, JR., 1885.]

The various ways in which Sparrows do harm to crops are well known to agriculturists; but perhaps by no one has the sequence of their proceedings in the field been better put than by the Rev. C. A. Johns (Brit. Birds, p. 202). Sometimes they make descents on the standing corn before the grain has attained full size, and near the hedges the busy pilferers are at work, and fly up in a swarm as you approach them, but when it is quite ripe they do the greatest harm. It is not only what they eat, but what they knock out.

A gentleman who is a practical farmer in North Lincolnshire—Mr. J. Cordeaux—tells me he has seen acres which had the appearance of being thrashed with a flail. Taking this into consideration, the opinion of the Melbourne (Derbyshire) Sparrow Club—that Sparrows destroy a quart of corn apiece during the summer (*vide* Zoologist, p. 2299)—is probably true. If thirty grains a day is a Sparrow's ordinary meal during June, July, and August (and I do not think this is far from the mark, having repeatedly found twenty and twenty-five whole grains, and once, in November, forty, in a Sparrow's crop), it would have eaten, during those three months, two thousand seven hundred and sixty grains, which is nearly a third of a pint; or if, take the whole year round, each Sparrow eats, on an average, fifteen grains a day, then each Sparrow eats in a year five thousand four hundred and seventy-five grains. This is none too high an estimate, for the quantity which Sparrows eat at stacks in wintertime equals what they take from the fields in the summer. During the operations of harvest, I understand they may often be seen sticking to the gradually lessening square of corn until all the field is cut. They then transfer their attention to the sheaves, and also divide with the gleaners what is left on the stubble. Finally, when the farmer has sold his produce, Sparrows take a very large toll out of any portion of it which a purchaser may give to his poultry, as every breeder of chickens and turkeys knows very well. At the end of September a marked decrease is to be seen in their numbers, but whether this is caused by real emigration or by local movements is not clear. It has often been said that Sparrows come to us over the North Sea in the autumn; but among the numerous "wings" I have had from light-houses and light-vessels I have never received this species.*

In October Sparrows pack into flocks of from two hundred to three hundred and leave the homesteads. That month is mostly spent in the fields, and so is November; and here they find plenty of occupation, sometimes hunting on their own account, sometimes with other small birds. With the first fall of snow away they go to the stacks, on the sides of which they may be seen clustering; or, if it is not too deep, searching on the ground for grain which has been shaken out, with chaffinches and yellowhammers. At all times stacks are a great attraction. It is said that preference is given to a wheat stack; but Sparrows are not particular so long as they can get grain. Needless to say, that threshing is a matter of the highest interest to Sparrows.†

February and March are spent almost entirely in the vicinity of houses and farmyards, or any place where corn is to be found, unless, as previously mentioned, they are attracted to a distance by the operation of threshing. I agree in thinking that at this period the opinion of Colonel Russell, who continues the discussion after me, that corn forms 90 per cent. of their food is true. At the end of March fields are sown, and Sparrows show not infrequently, by their presence, that they wish to levy the usual tribute; but it is certain that where a drill is used the grain is deposited too deeply in the soil for any small birds to reach it, except skylarks, which are said to dig it up sometimes; but Sparrows get the drilled barley and oats when they begin to sprout.

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* But the nearly allied tree-sparrow (*Passer montanus*) is a well-known migrant.

† Mr. B. B. Sapwell remarks that when a stack has been threshed ever so far away from the yard, the Sparrows in the yard have always had their crops full of the grain (*in litt.*).

In addition to the remarks already made on this point—the damage done to corn by Sparrows—it would be easy to cite many instances of great and unusual harm caused to tenant farmers by Sparrows, but they are too vague for the purpose; indeed, in such a matter it is exceedingly difficult to be precise. In some instances, and especially near towns, extraordinary estimates have been formed of the damage by the most competent valuers, but as these valuers were not ornithologists, it is not clear that some of the damage was not done by greenfinches and chaffinches. I have seen large flocks in the fields in November, which I at first thought were Sparrows, but which proved on closer inspection to be entirely composed of the species just named.

The following true story was related to me by Colonel Russell: A farmer at Boreham, near Chelmsford, named Hurrell, had an early field of wheat not far from the village. The Sparrows attacked it in the corner nearest the village and devoured a great deal there. The crop was uniform, except from what the Sparrows did. Hurrell measured an acre where the Sparrows had been at work, and an adjoining acre which they had not meddled with, and thrashed the corn on each of the acres separately, looking after the thrashing himself. He found the deficiency to be two quarters (16 bushels); value at the time, £6.

The Food of young Sparrows.

The Sparrow lays five or six grayish-white eggs, spotted with brown and ash color, and has frequently three broods in the year, the first being hatched towards the end of May. Young Sparrows in the nest are generally fed on caterpillars and other insects,* particularly in August, yet a good many may be opened in June and July without finding any in them. The parent Sparrows will begin to feed them on caterpillars when but a day old, but they seem to discontinue the diet a little time before they leave the nest, though, on the other hand, some young Sparrows which were quite ready to leave the nest, examined in Norfolk, did contain a few small caterpillars. But of this I am sure that while very young their diet is quite as much unripe corn and vegetable matter as caterpillars.† Even at the age of one day a Sparrow will feed its young one on a grain of ripe corn. Say that a young Sparrow eats fourteen or fifteen young caterpillars a day, that is probably as good a guess as we can make. If this only went on for ten days the sum total destroyed would be very vast, and some of the caterpillars of very injurious kinds, such as *Caradrina cubicularis*, the pale mottled willow moth of Curtis (Farm Insects, p. 308), identified for me by Mr. C. G. Barrett and the Rev. J. Hellins.‡

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* An instance of young Sparrows being fed on water-beetles occurred at the beginning of August, 1884. My father ordered a pond to be cleaned out, at the bottom of which were a great many small water-beetles; these, the gardener tells me, were eagerly collected by Sparrows, ten or twelve at a time, carrying mouthsful of them, away to feed their young with in the adjoining nests.

† Colonel Russell says he has known young Sparrows to be fed with ripe wheat, which he was able to prove the old birds had to go half a mile for.—Field, June 22, 1878.

‡ Several continental naturalists include the cockchafer in the Sparrow's food; but I think that most likely the chovy (*Phyllopertha*) is intended as well. Professor Newton (Yarrell, *British Birds*, Part X, p. 92) and Mr. H. Stevenson (*Birds of Norfolk*, I, p. 211) tell us that the Sparrow eats "chovies," *P. horticola*, and the former says he has seen their mouths literally crammed with them; and Mr. John Curtis says that he has known of Sparrows gorging themselves to such an extent with, "chovies" as to be unable to fly (*Farm Insects*, pp. 220, 510). Professor Newton says it begins to come out of the ground towards the end of May, and the perfect insect carries on its ravages until July (Professor Newton, *in litt.*).

If one-fourth of the young Sparrows hatched in England are fed for ten days on fourteen caterpillars apiece, it is easy to make a calculation of how many they would eat in a large agricultural county like Norfolk. Norfolk contains eight hundred parishes; say that eight hundred young Sparrows are annually hatched in each parish, that gives us a total of six hundred and forty thousand Sparrows. If one-fourth of them are fed on caterpillars, we should have twenty-two million four hundred thousand of these destructive creatures eaten in this one county alone, every year, by Sparrows. So that there is a very nice balance to adjust in a matter which the most expert observer might find difficult. On the one hand the young Sparrows are fed on a great many caterpillars; on the other hand they are fed with grain, but this is mixed with weeds and other vegetable matter. Again, there is a side light in which to look at the question. If the Sparrows were dead, how many of these caterpillars would be eaten by other small birds? We may be quite sure that a considerable portion of them would *not* be eaten, unless chaffinches and greenfinches become more numerous than they are now; and if this was so, would not they speedily become much more addicted to corn? I think there is not a doubt about it.

Sparrows keep down Weeds.

Sparrows do much good to the farmer, in conjunction with many other little birds, by consuming vast numbers of the seeds of weeds. I think not nearly enough has been made of this by their friends and supporters. The following is a list of those which have been actually identified, with my authority for each:

Wild spinach (*Chenopodium bonus-henricus*), Mr. A. Willis.*
Knot grass (*Polygonum aviculare*), Mr. F. A. Lees.*
Black or corn bindweed (*P. convolvulus*), Mr. F. A. Lees.
Dandelion (*Taraxacum officinale*).
Goosefoot (*Chenopodium album*), Mr. F. A. Lees.
Field mustard (*Sinapis arvensis*), Professor Macgillivray.†
Chickweed (*Stellaria media*), Colonel Russell.*
Mouse ear (*Cerastium triviale*), Professor Macgillivray.
Wild radish (*Raphanus raphanistrum*), Professor Macgillivray.
Dock (*Rumex crispus*), Mr. F. A. Lees.
Pale-flowered persicaria (*Polygonum lapathifolium*), Mr. F. A. Lees.
Buttercup, Mr. H. N. Slater.

These seeds will spread from a hedge, the sides of which are not brushed with a reaping-hook in the summer, and make a field very foul; so that every one must admit that Sparrows and small birds generally do some amount of good by keeping them down. A remarkable instance was mentioned some years ago in the *Times*, of a field sown with grass and clover seeds, over which a luxuriant growth of knot grass (*P. aviculare*) spread. The farmer thought that his crop was ruined, but in September such swarms of Sparrows as he had never seen before visited the field and fed on the small shining seeds of the knot grass. I regret that I have neither got the date of the letter, nor the name of the writer, the communication, according to a bad practice prevalent among observers, being anonymous.

A Sparrow's crop will contain a great many small seeds. Dr. Schleh found three hundred and twenty-one whole seeds of chickweed in the crop of one Sparrow in Germany! In one shot at Northrepps, in Norfolk, one hundred and forty-seven were actually counted, and many more were ground up into pulp in the gizzard. Digestion is rapid, and at this rate a vast number would be consumed in a very short time.

It need hardly be said that the present contribution, including the table which follows, does not exhaust the Sparrow controversy. It leaves many interesting points almost untouched.

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* *In litt.*

† "British Birds," I, p. 344.

The Food of Sparrows during each Month of the Year.

Six hundred and ninety-four dissections have been made in the preparation of the following table, by various hands, in various places. They have been made at nearly regular intervals—certainly during every month of the year, and I may almost say during every week. It is therefore hoped they will give a reliable idea of what the customary food of Sparrows is and what their occasional food. I confess this latter phrase is somewhat vague, but have felt the necessity of employing it in default of a better. The column under this heading might no doubt be further extended.

Maize has only been entered under two months; but where Sparrows have an opportunity of obtaining it, maize would be found in their crops at any time of the year. They will also eat bread, potatoes, rice, pastry, raisins, currants, etc., but as these things have no bearing on the amount of harm which Sparrows do to agriculture,* they are not included in the table. Credit must be given to them as scavengers in a small way in our crowded cities, where they consume matter such as I have named, which if left would decay and be injurious to health.

Among those who have assisted in the inquiry my thanks are especially due to my father, Mr. A. Willis, Mr. B. B. Sapwell, Mr. G. Roberts, Mr. F. Norgate, Mr. C. L. Buxton, Mr. T. Southwell, Mr. T. E. Gunn, Mr. F. A. Lees, Mr. C. G. Barrett, Mr. H. H. Slater, and Colonel Russell. I have further availed myself of sundry notes published in the Zoologist, by Messrs. Hepburn, Hawley, and Wilson; and some material has been gathered from other scattered sources, which I have particularized in the table.

Food of adult Sparrows.

January.—Customary food: Corn from stacks and from poultry yards; seeds of all kinds. Occasional food: Refuse corn, such as is scattered in roads and would never be of use; maize. Capsules of moss (H. H. Slater).

February.—Customary food: Corn from stacks and poultry yards. Occasional food: Seeds; buds of gooseberries (G. Roberts).

March.—Customary food: Corn wherever they can get it. Occasional food: Young tops of peas, radish, cabbage, and cauliflower; seeds (Wilson); freshly-sown barley and oats.

April.—Customary food: Corn; vegetable matter. Occasional food: Freshly-sown barley and oats; oblong green seeds, not identified; caterpillars.

May.—Customary food: Corn; vegetable matter; seeds. Occasional food: Young pea-pods and leaves of peas; gooseberry blossoms and young gooseberries; small beetles; caterpillars of the brimstone moth, and white-cabbage butterflies (J. Hawley); turnip seed (A. Hepburn and R. Lowe); hay seed (C. L. Buxton); sprouts of young barley, half an inch long; pollen of the sycamore tree and apple†; mangel-wurzel leaves (B. B. Sapwell).

June.—Customary food: Corn; vegetable matter; peas; seeds of various sorts. Occasional food: Gooseberries and other fruits; lettuce (A. Willis); small beetles; mangel-wurzel leaves‡ (B. B. Sapwell).

July.—Customary food: Young wheat, barley, and oats; vegetable matter; seeds of various weeds. Occasional food: Peas; small beetles; beans (A. Willis); seeds of wild spinach (A. Willis).

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* If the pigs have barley meal they rob them of some of it, as well as any other food which is given to them.

† It seems that the actual blossom is not eaten, but rather that a portion of it is masticated for the drop of nectar at the base of the petals. For the same reason the crocus and other garden flowers are destroyed. The blossoms of fruit trees seem to be attacked for the pollen.

‡ Mr. R. Lowe has observed them feeding on the young unopened buds of Swede turnips just bursting into flower for seed.—(Report on Observations on Injurious Insects, 1883.)

August.—Customary food: Wheat, barley, oats. Occasional food: Seeds of corn, bind-weed, knot-grass, etc. (see list, page 343); aphides, small beetles, daddy-long-legs (Tipula), caterpillars of *Teras contaminana,* moth of *Crambus culmellus** (E. F. Becher and F. Norgate).

September.—Customary food: Corn; seeds of many kinds, especially the knot-grass and corn bind-weed. Occasional food: Caterpillars; berries; seeds of plantain (T. Southwell).

October.—Customary food: Grain, some of it refuse grain; seeds of many kinds, including knot-grass.

November.—Customary food: Grain; seeds of plants. Occasional food: Newly-sown seeds of wheat; small caterpillars.

December.—Customary food: Grain, principally obtained from stacks. Occasional food: Seeds; maize; sprouting bean (H. H. Slater).

Food of young Sparrows to the Time of leaving the Nest.

May.—Customary food: Grains of last year's corn; small beetles; caterpillars. Occasional food: Buds (F. Norgate); red spider (J. H. G.); hair-worms (J. H. G.); small flies (J. H. G.).

June.—Customary food: Caterpillars of various kinds up to three-quarters of an inch in length; young wheat. Occasional food: Beetles; large, brown cabbage-moth (W. Johns); wire worms.

July.—Customary food: Caterpillars; beetles; soft, milky grains of wheat and barley. Occasional food: Blue-bottle flies (J. Duff).

August.—Customary food: Caterpillars; beetles; young corn. Occasional food: Small chrysalides.

Summary.

To give a summary of this table in a few words, it may be said that about seventy-five per cent. of an adult Sparrow's food during its life is corn of some kind. The remaining twenty-five per cent. may be roughly divided as follows:

	Per cent.
Seeds of weeds	10
Green peas	4
Beetles	3
Caterpillars	2
Insects which fly	1
Other things	5

In young Sparrows not more than forty per cent. is corn, while about forty per cent. consists of caterpillars, and ten per cent. of small beetles. This is up to the age of sixteen days. Where green peas abound, as in market gardens, they form a much larger proportion of the Sparrow's food than the four per cent. here stated.

Sparrows generally contain in their gizzards a considerable quantity of small stones, gravel, sand, brick, coal, etc., but these are only intended to grind the real food. In default of these substances they will swallow small mollusks, fragments of egg-shell, fragments of snail shells, etc.

Sparrows should be killed for dissection in the afternoon. In adult Sparrows the crop will generally give a far better idea of their day's meal than the gizzard, in which the food is so comminuted as to be with difficulty identified. If the Sparrows are caught at night they have digested their food in a great measure, and yield much less satisfactory results; the crops at that time are always empty.

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* I have notes of Sparrows occasionally feeding on the yellow underwing, ermine moth, and a few other insects in the perfect state, but the date at which the observation was made not having been taken down, it can only be approximately guessed at from the time at which they usually appear. Everybody must at some time or another have observed their clumsy efforts to catch some common butterfly.

[FROM "THE HOUSE SPARROW" (PART 2), BY COL. C. RUSSELL.]

To give one instance, a few years ago, seeing Sparrows about a few martins' nests on a new small house near my own, I asked the man who lived there whether he liked the Sparrows. He said, "I hate them, and am throwing stones at them all day, but can not keep them from the martins' nests." I lent him a gun. His son, a boy about twelve years old, took kindly to shooting the Sparrows, killed, I think, nearly two hundred in less than a month, and always kept the place free from them. In two years there were twenty-four martins' nests on the house. The man then died, and the next tenant, having no son to shoot the Sparrows, did not trouble himself about the martins, and the Sparrows cleared them all out in one season. The martins have often built a few nests, but I do not think that any young ones have flown there since.

The martins, which feed exclusively on insects, if left in possession of their nests, would, unlike many other birds, increase with the population of the country and number of houses. Besides the persecution by Sparrows, there is no condition unfavorable to the martins except that when, with their natural confidence in man—too often misplaced—they make their nests close to windows or doors for protection people commonly destroy them, thus completing the exterminating work of the Sparrows. I have heard it said "they come there for mischief: they might build anywhere else." Few seem to notice that, unless where Sparrows dare not come, the martins can not keep a nest. The only thing which saves these birds from total extermination in this country seems to be this: they sometimes manage to rear a late brood after the "fell adversary to house martins" (as White, of Selborne, rightly called the Sparrow) has left off nesting and betaken himself to the wheat-fields. But in this way the martins are kept here too long, and sometimes, before their young can fly, are caught by sharp frost in October and die. The last numerous colony that I knew of, within a few miles of my house, was thus cleared out a few years ago, while my martins, protected from Sparrows, and always getting their young off in good time, took no harm.

About my premises the martins, formerly numerous, as elsewhere, became fewer and fewer, until in 1869 they had nearly disappeared, young ones flying, I think, from only two nests—one close to a window, the other to a door. Towards the end of May, 1870, several nests, freshly built under the eaves of the pigeon-house, their favorite place, were all found to be in the possession of Sparrows. The indignation with which I had seen this persecution all my life at last boiled over, and, resolving that the martins should have one safe place, I began to protect them by killing down the Sparrows. It was a hard fight at first; the martins' nests had to be watched almost constantly, and, if I remember rightly, one hundred and fifty Sparrows were shot—mostly about these nests—in about a fortnight. War has been waged against them ever since. The first year or two we did not take the trouble to kill them in winter, but this did not answer; a great number lived about the place, many roosting in the martins' nests. When we began shooting the Sparrows in spring they would all go away for a day or two, but kept coming back again, so that constant watchfulness for weeks was required to kill them down. The plan was therefore adopted of paying a penny for shooting each Sparrow as soon as it shows itself all the year round. They are shot with very small charges of dust shot, mostly from inside doors and windows, or from loop-holes, made to command the places they generally come to. They dislike this practice, and do not come much—less and less every year. The plan has been most successful. The place is wonderfully free from Sparrows—sometimes we do not see one for weeks together—and the martins have increased in numbers, till last year they had one hundred and seventy nests about my house and buildings, and this year there are two hundred and thirty-seven, and more will be built yet.

In gardens Sparrows do much mischief, as by feeding off young peas, eating green peas from the pods, stripping gooseberry bushes of their fruit-buds, destroying flowers, etc. The question remains whether they do good enough in gardens to make up for such misdeeds. Now, to prove that Sparrows are really useful, it is not enough to show that they destroy some injurious insects, it must also be proved that, in their absence, other birds would not destroy them, at least as effectually. This can be found out only in one way—by banishing the Sparrows from a place for some years. My object in letting no Sparrows live about my house, buildings, and gardens, has been not only to protect the martins (perhaps it would be enough for this to kill those Sparrows only which go near their nests), but also to get a better test of the utility of Sparrows than could otherwise be got by any amount of examination of the food in them. My place is a fair specimen of the country, having flower and kitchen gardens, shrubberies, and small orchard, surrounded by meadows, with corn fields within easy reach all round. All birds except Sparrows have been let alone there.

Sparrows having been almost entirely absent for many years, if they took insects which other birds do not, such insects would have become very numerous, and the food in Sparrows killed there would show this. Now, it has been quite as unusual to find an insect in an old Sparrow there as elsewhere. Fifty old Sparrows and young ones which could feed themselves were killed one summer about my buildings and garden, with food in their crops. This food, carefully examined (as in all cases with a lens), was found to be corn, milky, green, and ripe, and sometimes green peas from my garden; only two small insects were found in the whole number. The food in them has been much the same every year. Examining the old birds, however, is not test enough, as they eat very few insects anywhere ; but if any were the peculiar prey of Sparrows, they would be found in quantity in any young ones bred about my place. To test this, when a pair or two of Sparrows, as happens most years, contrive, by keeping clear of the buildings, to escape being shot long enough to build a nest and hatch young ones, these have been taken (by choice when about half grown), and the food in them carefully examined. It has varied greatly, but certainly there were not more insects among it, I think less than there usually are where Sparrows abound. In the only nest known of one year the food in the four young ones was chiefly green peas, with some grains of green wheat, one small beetle, and some half dozen small insects of species unknown to me. In the only nest the following year the young ones had little in them except corn—old wheat, if I remember rightly. Some broods have contained small beetles (which, mostly soft ones, I have found in Sparrows old and young, from all sorts of places, oftener than caterpillars) and a few wild seeds. One brood had a mixture of beetles and ripe wheat. One grasshopper's leg and a very few pieces of earwigs have also been found. Of caterpillars, said to be kept down by Sparrows, only two small ones in eight callow birds, from two nests taken at the same time, have been found in all the years that these nestlings have been examined, and no trace of an aphis. The absence of caterpillars is the only difference that I have noticed in the character of the insect-food in the young Sparrows at my place and elsewhere. On the whole, the deduction from the food-test during fifteen years seems to be that the Sparrows are useless, and that the insects which would be given to their young by them if they were allowed to live in numbers about my premises would be so much food taken, when they most want it, from better birds which live entirely, or nearly so, on insects, and thus keep them, especially caterpillars, down so effectively in the absence of Sparrows that, when a chance pair of these come and build, there are few of their favorite sorts for them.

[The Guardian, Manchester, England, January 30, 1888.]

ENORMOUS DESTRUCTION OF SPARROWS IN CHESHIRE.

At the annual meeting of the Cheshire Farmers' Club on Saturday evening, the chairman, Mr. John Roberts, the largest tenant-farmer on the Hawarden estate, referred to the havoc wrought by the common House Sparrow among grain crops, and said that the Wirral farmers of Cheshire were paying 6*d.* per dozen for all Sparrows killed, and some idea of the fecundity of the pest might be formed from the fact that without appreciably affecting their numbers in that district, no less a sum than £14 15*s.* 6*d.* had been recently spent in that way, representing the destruction of seven thousand one hundred and ninety-two Sparrows.

[New England Farmer (Boston, Mass.), 1886.]

In a report to the Royal Agricultural Society of England, by its consulting entomologist, Miss Eleanor A. Ormerod, the following conclusions are drawn regarding the habits of this much-discussed little foreigner:

"With regard to the special item of Sparrows, I feel no doubt that measures should be taken to check their enormous increase, and where communication has been sent me from districts in which these birds were known to do serious damage to the crops in autumn, I have strongly advised that their number should be lessened. We do not find from examination of their contents that they feed on corn red-maggot, corn thrips, corn aphis, or any other corn insect, nor have we any observations of fields infested by these huge flocks being freer than other places from insect attack. From careful observations in different places, extending over a period of from one to fifteen years, we do not find any diminution of insects round the farm buildings where the Sparrows greatly resort, but find that they have been observed in many cases to drive away true insect-feeding birds."

It should be remembered that the term "corn" is applied in England to the small grains, wheat, oats, barley, etc., and not to our American maize.

TESTIMONY RELATING MAINLY TO THE SPARROW IN AUSTRALIA.

FROM THE DRAFT PROGRESS REPORT OF THE BOARD OF INVESTIGATION APPOINTED BY THE GOVERNOR OF SOUTH AUSTRALIA IN 1881.

[On August 4, 1881, a board of investigation consisting of eight members was appointed by the governor of the Province of South Australia with "full power and authority diligently to inquire into and report upon the alleged injuries caused to fruit-growers, gardeners, farmers, and others by Sparrows, and to consider the desirability of taking steps for their destruction, and to report upon the best means to be employed therefor."

On August 31, this board submitted the following progress report:]

DRAFT PROGRESS REPORT.

To His Excellency, Sir William Francis Drummond Jervois, major-general in Her Majesty's army, * * * governor and commander-in-chief in and over the Province of South Australia and the dependencies thereof, etc.:

May it please your Excellency: We, the Commissioners appointed to inquire into the alleged damages caused by Sparrows to horticulture and agriculture in South Australia and into remedial measures and to report thereon, having proof of the evil existing in great force and over large districts of country, and being convinced that their destruction is urgent before another fruit season sets in, and before another nesting season (now beginning) shall swell their numbers, beg to present a Progress Report:

I. We append an analysis of correspondence on the questions of inquiry. This shows—

(1) That the Sparrow is established over an area of the colony comprising Adelaide and its suburbs from the sea-coast eastward well up to the hills; southwards to Happy Valley, Coromandel Valley, and Willunga; northwards to Allendale, and far on—though we hope as yet detached—at Beetaloo. In the southeast, Mount Gambier possesses a center of its own.

(2) That the responses of sufferers within the foregoing area cry for relief from Sparrow depredations as if from a pest, and with what reason, the following statements, as examples, may show: From Mr. John Chambers, of South Richmond: "In the short space of ten days the Sparrows took a ton and a half of grapes. They stripped all the figs of five trees. They kept low 15 acres of lucerne during the summer." From Mr. Finden, of Salisbury: "This season they (the Sparrows) took £30 worth of fruit." Mr. Wilcox, of Lower Mitcham: "Has three times this season sown peas, and they have each time been destroyed by Sparrows."

(3) That the species of Sparrow domiciling in South Australia damages or consumes fruits, cereals, and vegetables. Its fecundity is astonishing. A few to-day are thousands next season. Its work is done on a magnitude despairing to the cultivator, and under conditions he can not control; for the seed is taken out of the ground, the fruit-bud off the tree, the sprouting vegetable as fast as it grows, and the fruit ere it is ripe, and therefore before it can be housed and saved.

(4) That the cultivations attacked by Sparrows are as follows: Of fruits: Apricots, cherries, figs, apples, grapes, peaches, plums, pears, nectarines, loquats, and olives. Of cereals: Wheat and barley. Of Vegetables: Peas, cabbages, cauliflowers, and garden seeds generally.

(5) That the means of defense tried against the Sparrow depredations have been scare-crows, traps, netting, shooting, poison of phosphorous, arsenic, and strychnine, applied through grain, bread, bran, and sugar. The results are generally stated as having been insufficient, which may be due to the modes of administration rather than to defects in the materials employed.

(6) To the above expedients the following are suggested by our correspondents, namely: The tender of rewards for Sparrows' eggs and heads, the removal of gun licenses for the season, poisoned water in summer, sulphur fumes under roosts at night, and plaster of Paris mixed with oatmeal and flour. It is further declared that the united action of all property holders, including the government, in infested districts is essential to effective results.

II. Without reference to ulterior measures, which may be influenced by inquiries the commission have on foot, their object in tendering this progress report is to submit for the approval of your excellency the propriety of at once setting to work one useful means applicable to the breeding season now commencing, namely: A system of rewards for Sparrows' eggs and heads, through responsible agents readily accessible in the various Sparrow districts; and we suggest, as a trial, that the rate of payment should be 6*d.* per dozen for Sparrows' heads delivered, and 2*s.* 6*d.* per one hundred for Sparrows' eggs delivered; each class to be supplemented by a bonus of   to any one who delivered in one season   eggs or   Sparrows.

III. Your committee have not received any evidence in defence of the Sparrow counterbalancing the damage he does. They have sought proof of his insectivorous habits, but with little result.

[The following are fair samples of the evidence collected and published by the commission. These reports all come from points within a hundred miles of the city of Adelaide, South Australia.]

[Joseph Barnes, Richmond.]

Sparrows very numerous; great damage done to fruits—apricots, grapes, figs, and plums. Has heard that wheat steeped in turpentine will kill them, and intends to try it.

[John James Beverly, Chairman Woodville District Council.]

Sparrows are in his neighborhood to the number of tens of thousands, and they destroy buds of fruit trees to an enormous extent. Has used Pitt's wheat, but it is not successful after the first day or two. Thinks every householder should be compelled to adopt the means recommended by the commission to destroy them.

[Henry Broad, Marden.]

Sparrows are plentiful in his neighborhood, and very destructive to fruit, and has shot some occasionally. Shooting would help to keep them down, but it is a slow process. Poisoned grain and poisoned water would also be very destructive to them. Thinks netting them at night-time when roosting in orange and olive and other trees would be effective in thinning their numbers.

[Beaumont Cole, Adelaide.]

When a boy he used to destroy Sparrows and small birds by spreading wheat steeped in a solution of nux vomica. The nux vomica figs were cut into small pieces and stewed all day, when the hot liquor was poured on as much wheat as it would cover, and allowed to stand till morning. The wheat was then dried and spread out, and he used to find many dead birds about, which he buried. Found it necessary, however, to tempt the birds first of all by feeding them with clean grain.

[Rev. Dr. Craig, Mount Gambier.]

Sparrows are there in great numbers, and they eat most of the soft fruits and cherries long before they are ripe. Farmers also report that they eat corn both when sown and when ripe. The Agricultural and Horticultural Society have offered sixpence per dozen for Sparrow heads and four pence per dozen for Sparrow eggs. Has tried Faulding's phosphoric wheat, which killed a few, but thinks phosphorized clover seed or seed smaller than wheat would be better.

[Hon. John Crozier, Oaklands.]

There is no doubt that if allowed to go unchecked they will not only destroy the vineyards and orchards, but also destroy most of the grain in the fields. Suggests that poisoned water should be placed in the neighborhood of their haunts, out of the reach of domestic animals, and also that diligent search should be made in the breeding season for nests and eggs. States that two boys in one day obtained one thousand nine hundred eggs on his property. Hay-stacks and hedges are their favorite haunts. Is afraid if the gun license is removed that the indiscriminate use of fire-arms will be a more dangerous nuisance than the Sparrows.

[Henry Douglas, Happy Valley.]

Sparrows have established themselves very firmly in his neighborhood, and the damage caused by them during last fruit season was very great. In the worst parts of their haunts the grapes were literally cleared from the vines. Few efforts have been made to destroy them, as desultory action has been considered to be useless. Can not suggest a remedy, but is convinced the question of their destruction is of vital importance, and hopes the united action contemplated by the commission will be attended with success.

[Anthony Etheridge, Elizabeth street, Norwood.]

Sparrows have established themselves by thousands in Kent Town, Kensington, and Norwood. Had had his apricot trees stripped by Sparrows, who also destroyed plums, grapes, and figs.

[Thomas Fairbrother, Fullarton.]

Sparrows are in his neighborhood by thousands and destroy tons of fruit. Shooting is the only means which has been taken to destroy them. Thinks a reward of, say, *4d.* per dozen for old or young Sparrows would encourage boys to capture them, and so thin their numbers.

[Thomas Filmer, Glenelg.]

Sparrows have fully established themselves at the Sturt and Brighton, and unless something is done is sure the loss to fruit-growers and corn-growers will be very great. Is not aware of anything having been done to destroy them. Incloses the following recipe from the Melbourne Leader for destroying Sparrows and other birds: "Take 5s. worth of strychnine, dissolve in half a teacupful of warm vinegar or acetic acid, add that to four or five quarts of water, and put into that as much wheat as will soak up the liquid. The wheat to be distributed where the birds will pick it up."

[W. H. Harrold, Mount Gambier.]

Sparrows have thoroughly established themselves all round Mount Gambier. Last season they destroyed in turn fully one-half of his cherries, plums, apricots, pears, and apples, and what was saved had to be gathered unripe. Had a nice patch of wheat completely destroyed by them as it was ripening. Had tried grain poisoned with arsenic and strychnia, but it has not proved effective; the Sparrows eye out the poisoned grain and avoid it. Thinks large numbers of them might be shot, and their nests should also be hunted for and destroyed.

[J. Hobbs, East Marden.]

Sparrows are established in great numbers in this locality, and they are most injurious to figs, loquats, apricots, plums, peaches, cherries, nectarines, and grapes. The latter suffer most.

[S. R. James, Marden.]

Sparrows have thoroughly established themselves in this neighborhood, and oranges are literally whitened with their droppings. Loquats, cherries, American plums, and apricots will in turn be attacked by them as they ripen. Last year from a crop from two hundred trees he dare not let any of the fruit ripen for fear of it being pecked and destroyed by these birds. Although he had a large crop of figs, it was with difficulty that he saved a few for market.

[M. McShene, Campbelltown.]

His neighborhood is very much troubled with Sparrows; they breed in the banks of the river and swarm over the gardens. They destroyed nearly all the buds on the apricot trees last year and spoiled the fruit which matured. Does not know what to do to get rid of them; only wishes he did.

[M. A. Price, Gilberton.]

Is much troubled with Sparrows, which come in flocks of hundreds and destroy the fruit. Last season did not have one bunch of ripe grapes, except those she covered with strong bags. Tried several devices, as scarecrows, but they were ineffective. They seem to eat nothing but fruit and tender vegetables, and hopes something will be done to destroy them before another fruit season comes on.

[H. C. Quick, Shiraz Vineyard, Marden.]

Sparrows are established in his neighborhood in immense numbers, and are very destructive to fruits, especially grapes of the finest kinds. His loss by them is incalculable. Numbers are destroyed by poison and nets, but they are vastly on the increase, and the prospects of fruit-growing are most alarming. Suggests that the commission should arrange for selling as cheaply as possible "ground-nets" and "bat-nets" for catching Sparrows.

[John Rudall, town clerk, Gawler.]

Sparrows are becoming numerous in Gawler, but is not aware of the extent of the mischief caused by them, and has no suggestion to make for their destruction, although it is thought that steps should be taken to prevent their increase. No systematic means has been used in that neighborhood to destroy Sparrows beyond a persistent search by boys for their nests.

[C. Reeves, Gilbert street, Norwood.]

Sparrows destroyed all his figs, apricots, and grapes last season. Intends to try plaster of Paris mixed with oatmeal and flour, but also thinks wheat poisoned with arsenic will be effective.

[J. B. Scarce, Gilberton.]

Sparrows have destroyed bushels of pears, apricots, plums, and grapes in his garden. Has a trellis of vines 80 feet in length, besides other vines, and was not able to cut a bunch of grapes. Thinks poisoned wheat the only effective means of destroying them.

[C. A. Stark, Belaloo, Wirrabara.]

During the last twelve months Sparrows have made their appearance in his garden, and he has killed sixty-four this year with bran poisoned with strychnia and placed in a saucer. Has also discovered four nests in his garden, which he purposes to destroy when the young ones have been hatched. Is afraid if they get established in the neighboring hills they will eat him out of his house and home. Sparrows, he says, breed twice in the season, and generally lay from four to six eggs each hatching. Thinks poisoning, netting, and destroying the nests are the best remedies.

[M. Salom, North Adelaide.]

Sparrows are constantly building in the gutters and down-pipes of the roof of his house, although he has had their nests frequently removed. The damage done to him personally, by causing overflow into walls and ceiling, he estimates at forty pounds during the past twelve months.

[W. F. Thompson, Happy Valley.]

His district is infested with Sparrows. Has 40 or 50 acres of vineyard, and the Sparrows play destruction with his grapes, and also with his neighbors' gardens and vineyards. Believes that if not got rid of they will destroy all the fruit and grain in the colony in a few years. Suggests, as means of destroying them, poisoning, netting, and shooting them, and pulling down their nests. Thinks a tax of one farthing per acre on all lands under crop south of Blinman should be levied to secure their destruction, or else let Sparrow districts be formed, the rates collected in which for their destruction should be subsidized by Government at the rate of £2 for £1. Is willing to co-operate with the commission by forming a local committee, if thought advisable.

[William Urlwin, Salisbury.]

Sparrows have established themselves in his district, and are very destructive to fruit, especially to grapes. Has no doubt, also, that they do great mischief to crops of wheat. Has tried poisoned wheat, but the great difficulty is to get them to take it, even when mixed with good wheat. Has found fowls dead which have eaten the poisoned wheat, and also cats, which he presumes had eaten the poisoned birds. Thinks the offer of head-money for Sparrows would decrease their number, and this could be paid through district councils and corporations.

[George Wilcox, Lower Mitcham.]

Suffered very considerably last fruit season from the Sparrows. They first attacked loquats, then apricots and peaches, amongst which they made sad havoc; then they stripped every cherry, and the grapes were fairly demolished. On a trellis, measuring three hundred feet long by ten feet high and ten feet wide, he had a splendid crop of grapes, but had not one presentable bunch. Tried Pitt's wheat, obtained from Faulding & Co., but only killed a few; they soon became too knowing to take the wheat. Believes poisoned water will be the most effective in summer. Has three times sown peas this season, but they have each time been destroyed by Sparrows.

[The Adelaide (Australia) Observer, Saturday, July 9, 1887.]

THE SPARROW NUISANCE.

Under the auspices of the Royal Agricultural and Horticultural Society, a meeting of persons interested in the destruction of Sparrows was called on Monday afternoon, July 4, in Register Chambers. There was a representative gathering of about twenty of the principal fruit-growers and others affected by the depredations of the ubiquitous bird, and the feeling in favor of devising some means for reducing the evil was unanimous.

Mr. Henry Kelly occupied the chair, and said he thought much could be done to lessen the evil complained of, although he feared that it would be impossible to eradicate the nuisance altogether, as the Sparrows had increased so much that they had got a complete hold of the country, where they most congregated. He remembered that before the rabbits became so alarmingly numerous there were some at Anlaby, near Kapunda, and were regarded as interesting. They began to increase, and became a nuisance, but could then have been destroyed with comparatively little expense. The question of the Sparrows had now become as important and costly to meet. These birds were extending up North, and he had seen thousands at Angaston and other places. They were not confined to the districts in the immediate neighborhood of Adelaide. They were increasing at a most alarming rate, and it was practically impossible to grow fruit now without netting over the trees.

Mr. Thomas Hardy said he initiated this present movement, and had prepared resolutions to deal with the question. This was a most important matter, and really affected the whole community. Unless the evil were dealt with energetically and systematically, the wine and fruit growers might as well stop altogether, for it would not pay to go on in a few years' time. At the time when the rabbit question was affecting the country the evil had grown to considerable proportions, but if systematic steps to eradicate the rabbits had been taken earlier the trouble would have been stopped. Few people knew the enormous cost of putting down the rabbits. He was told that in one station in New South Wales £20,000 a year had been paid for the destruction of rabbits, £15,000 by the Government and £5,000 by the owners. The Sparrow nuisance would be as great as the rabbit trouble. The great obstacle to anything practical being done lay in the fact that the deputations did not propose any definite scheme as a recommendation to the Government. The members of the Government were not expected to know so much of the means to be adopted as the men whose business the Sparrows most injured. But this was not a matter merely affecting a certain class, but the welfare of the country. He moved therefore that the Government be requested to bring in a bill for the destruction of Sparrows, to embody the following provisions [see page 355 of this Bulletin].

Isolated efforts went for nothing. A man might be surrounded by neighbors who were not injured by the Sparrows, but who had plantations and outhouses in which they bred in myriads, and therefore it was absolutely necessary that people should be authorized to go upon private property, under due restrictions, and seek for Sparrows. He knew from his traveling experience in the colonies that people who under-took rabbiting as an occupation got very expert at it, and it would be so in the case of Sparrow-catchers. As to the rating, it would touch people in their pockets, and make them take more interest in the matter. Three parts of the Sparrows were bred in the eaves and under the roofs of houses, chapels, public buildings, etc. Some houses had very small space between the ceiling and the roof, and Sparrows could breed there unmolested; but in premises with a greater space between roof and ceiling men could go and capture the young birds. He had known his boys bring down seventy young Sparrows from under his roof in that way. Netting was an excellent means. He had known one person at night catch one hundred and fifty Sparrows with a net. They could be caught easily on orange and other low trees with a net. Men should not be permitted to go upon private premises without due notice either day or night. Poisoned grain when good was effective, and here much might be done, due care of course being taken to prevent injury to people's fowls. Some of the poisoned grain was not good enough, but good grain should be procured by the district councils. This Sparrow question was of the utmost importance to fruit-growers and wine-makers, and the Sparrows did a deal of mischief, especially in the class of grapes grown for wine and raisins.

Mr. G. F. Ind said there was no doubt that the action taken against the Sparrows two years ago did a great deal towards abating the nuisance, but the discontinuance had allowed them to breed as fast as ever. While the Government was paying for the heads and eggs the destruction was considerable, but there was no inducement now to interfere with the birds except on the part of fruit-growers and farmers. It would be little use a man tilling the soil if the Sparrows were allowed to increase at the rate they did. At the Sparrow club to which he belonged the members put their money down and distributed poisoned wheat amongst those who would use it, but it was found to be of no use when the Sparrows were allowed to breed unmolested upon private and public property in the neighborhood. All must have an interest in the matter, and that could only be secured by a rate on the land-taxation system. That would raise enough to pay the expenses of exterminating the Sparrows; but until something uniform was done it would be no use individuals spending money. The people who were moving in this matter could not be accused of selfishness, for there was not one who would not put his hand into his pocket and pay his portion towards it. The citizens themselves would find that they were interested more than they perhaps imagined, because eventually they would have to pay dearer for their fruit, as the growers could not afford to carry on their business at the loss occasioned by the depredations of the Sparrows. He, as an exporter, had to pay pretty heavily, because he had to pay three people for the work that two could do but for the Sparrows. In the end the colony would be the loser, because vignerons and fruit-growers would get disheartened and find it impossible to carry on business.

Mr. S. Braund said in the case of one of his farmer tenants in the country the Sparrows had been so troublesome that he (the speaker) gave him permission to destroy a vineyard. He quite favored the idea of district councils taking the matter up, as it must be a general scheme of destruction, and it should be compulsory. No grain or fruit could be grown in the country to pay until the Sparrows were driven out. In one case 1,100 Sparrows had been taken from one place, and in another, down Brighton way, 1,300 were taken from a chapel. He believed that with the compulsory system and combined action the nuisance would be reduced to a minimum. He thought the district council should pay for the eggs.

Mr. C. Pitt added his testimony to the accumulation of Sparrows in the roofs of houses, and said it would be of no use attempting to do anything to reduce the nuisance effectually without legislation and united action.

Mr. Holmes, of Magill, said he had destroyed all the hedges around his premises, and some of his neighbors had forest land where the Sparrows bred. They were driven onto his place and he felt that he could not grow grapes with any success while the Sparrows were allowed to breed in the plantations. Any man acting by himself would be powerless. He was willing to be rated for the destruction of the Sparrows if the work was done systematically.

Mr. John Pitt testified to the havoc committed by the birds upon hard grapes as well as soft. He had often to destroy a hogshead of damaged bunches out of 200 or 300 cases when picking his grapes for shipment. The birds bred in the trees, and solitary efforts to destroy them were useless. He had sent boys over his vineyard with a kerosene-tin and a stick, and the Sparrows would pass over the lads' heads from one end of the vineyard and settle in the other.

Another speaker suggested that other birds destructive to fruit should be included in the provisions.

Mr. A. Molineux said he thoroughly sympathized with the meeting in their desire to organize some definite movements for the destruction of Sparrows. The farmer and agriculturist, as well as the horticulturist, suffered from the depredations of those birds, and the damage done by the Sparrow was now admitted by every one.

Mr. Hardy said the reason he proposed the rate to be uniform was that unless it were so, some districts might impose so light a rate that the Sparrows would be allowed to increase to the detriment of another.

A proposal that licensed catchers be allowed to use poisoned wheat under certain restrictions was objected to.

Mr. Braund and Mr. Ind thought poisoned grain would not be used because the birds might fly away and be lost to the trappers, who would therefore not care to use it.

Mr. Molineux suggested that district councils might issue a proclamation, appointing a certain day for laying down good grain to attract the Sparrows and another period for the free distribution of poisoned grain.

Mr. Hardy did not press the clause, and it was withdrawn.

With reference to a rate proposed to be fixed by the Government, Mr. Hardy said the object in allowing the Government to fix the rate was that it should be uniform.

After some discussion, this part of the proposition was struck out on the vote of 11 against 10, the opinion being that the district councils should fix the rate. The motion was agreed to. It was decided that a deputation of all interested wait upon the Government on a day to be fixed.

In accordance with this decision, about thirty or forty gardeners, fruit-growers, and vignerons, including members of the Royal Agricultural and Horticultural Society, waited on the treasurer (the Hon. T. Playford) on Friday afternoon to present the resolutions passed at the meeting held on Monday, July 4. Mr. H. Kelly, who was chairman at the meeting, presented the resolutions, which were as follows: "(1) That the Government be requested to bring in a bill for the destruction of Sparrows, to embody the following provisions; (2) that in all districts where Sparrows are known to exist the district councils or corporations shall make a special rate for the purpose of paying for the heads and eggs of Sparrows and other expenses incurred in their destruction; (3) that a certain number of men in each district be licensed by the councils or corporations to carry on the occupation of Sparrow-catchers, and that they be empowered to go upon private property upon giving such notice as may be considered necessary during the day time and pursue their calling, and that they be paid at a fixed rate for all heads and eggs that they may obtain; (4) that owners of property should allow licensed Sparrow-catchers and a sufficient number of assistants to go on their property at night up to 10 o'clock p. m., for the purpose of catching Sparrows with nets; (5) that each district council or corporation shall appoint some one to receive and pay for all Sparrows' heads and eggs both from licensed and unlicensed persons at a uniform fixed rate in all districts; (6) that all houses and buildings be examined by a person to be appointed for the purpose in each district to see that all inaccessible places where Sparrows can breed be effectually closed by wire netting or otherwise." He said that they did not desire the Government to assist them—all they wished was for the Government to bring in a bill to enable them not only to destroy Sparrows themselves, but to enforce it upon others. Something would have to be done with the Sparrow nuisance, which was as bad as the rabbits had been at Kapunda some years ago. If the Sparrows increased they would not be able to produce fruit of such fine quality as to enable them to dispose of it in the English market as well as in the other colonies.

Mr. T. Hardy, J. P., who initiated the resolutions, had taken a great interest in the matter. He had been a member of the royal commission some time ago which recommended the Bray Government to bring in a bill ordering the destruction of Sparrows, and in the mean time to continue the payment for heads and eggs. The Colton Government put a stop to the payment, and since that the nuisance had increased tenfold. If they continued to increase at the present rate the growth of soft fruits would not be particularly profitable. He had advocated fruit-growing to many people, but he was beginning to think he had made a mistake. They must have prompt, vigorous, and decisive action. He hoped in the mean time payment for heads and eggs would be resumed.

Mr. G. F. Ind said there could be no two opinions as to the necessity of checking the further increase of Sparrows. Individuals had tried various modes in all parts, but what was the use? If, for instance, he destroyed them on his own property, his neighbor took no trouble and allowed the birds to breed on his property as fast as they were killed anywhere else. Personally he had done his best to cope with the pest, and had paid a man half wages, found him in powder and shot, and, in addition, paid for the heads he produced, but even that was useless while the birds bred on the adjoining land. While payment was awarded for the heads and eggs by the Government not only in the city but also in the suburbs, there was a perceptible decrease in the number of birds; but as soon as payment was stopped and the Sparrows were not interfered with they multiplied quite ten times, and so great was the pest becoming that it was a question now with fruit-growers whether it was advisable to continue planting or not. Unless something was done it was of no earthly use increasing the vineyards or fruit gardens.

Mr. J. Curnow also reminded the treasurer that the deputation did not ask for a penny towards the work of destruction. The Sparrows were attacking his pears, about one-tenth of which he had found picked by the birds.

Mr. A. Molineux explained the habits of the birds, which were of the graminivorous class. They bred six months in the year, and each time had eight, so that the increase was enormous. If a man had a scabby sheep the whole country was alive to the fact and the animal was ordered to be destroyed, or perhaps the whole flock; but the Sparrows were allowed to multiply and do immense injury without anything being done.

Mr. S. Braund strongly supported the motion. The farmers, too, suffered immensely by the Sparrows, and something needed to be done to check the increase or the results would be ruinous to them.

Mr. H. Laffer said the birds were getting thoroughly established in the hills also. Whatever was done must be of a compulsory nature. He knew that large sums would have been laid out in planting but for the Sparrows.

Mr. J. Pitt said he had noticed that day that the Sparrows were now beginning with the olives. Messrs. Dwyer and J. T. Holmes supported the request.

The treasurer, in reply, said he was exceedingly pleased with the manner in which the deputation had brought the matter before him, because they did not, as was the case with most deputations, ask the Government for assistance with money. All they desired, he understood, was that power should be given to district councils and corporations to levy a small rate for the purpose of covering the expense of destroying the birds. He was not going into the modes suggested by the deputation, because he had to attend a meeting of cabinet and wished to get away. Although at one time he thought for a considerable period that the fruit-growers would be able to fairly cope with the trouble themselves, he was perfectly satisfied now of the difficulty of doing so, because he knew they were completely at the mercy of their neighbors, no matter what they did and how much money they spent. This year he had noticed the Sparrows in larger swarms than before. That very morning when coming to town he had seen some hundreds of thousands of them in a paddock, and was simply astonished at the multitude. In his own garden the birds this year had congregated in many thousands and he had shot them, but those which escaped went to other people's property where they were undisturbed. He was quite satisfied that not only the fruit industry but also that of the farmers would suffer unless some steps were taken in the matter. Along the Magill road last year there was a slip of wheat which had been left in a paddock by one of the farmers who wished to save some seed, but before the wheat was fairly ripe or fit for the Ridley reaper or common reaper the Sparrows attacked it, and more than half of the crop was eaten by them. Besides that he also observed that the birds quickly lodged on the ears, which consequently bent down and broke the straws, so that of course it could not be reaped. He would be able to favorably recommend the proposal of the deputation to his colleagues, but whether it would be dealt with in the district councils bill or put into a small separate bill which could be easily amended he could not then say. For his own part he was convinced the Government would have to do something. There was one method for the destruction of the birds which could be effectively adopted if done properly. At a certain time of the year, when there was no fruit and the birds had to live upon seed, a little judicious management of poisonous grain would destroy large numbers. But the Sparrow was cunning and people must be equally cunning in dealing with him. The way in which the work was accomplished at a place near Melbourne was as follows: A piece of ground was fixed upon where Sparrows were numerous, and they were fed regularly for, say a month, so that they looked for their meals like fowls in a yard. On a certain day poisoned grain was slipped in, and the result was a wholesale destruction.

He would not detain the deputation, and might say he hoped to be able to persuade his colleagues that some action required to be taken. The best course in his opinion was to allow a small rate to be levied as suggested.

The deputation then withdrew.

[From the Taranaki (New Zealand) Herald, 1886.]

Farmers who are putting in crops are experiencing much difficulty in protecting their seed from the Sparrows, which begin their ravages at daybreak, and need watching until dark. A member of the land board informs us that as he was driving into town to attend the special meeting of the board, on Monday, his curiosity was aroused by hearing the continual cracking of a whip in a field close to the road. On making inquiries he ascertained that it was a farmer with a stock whip, and he was adopting this method of frightening the birds. He said he had been at this work about a week, and had to be on the field from early morning until night, or the Sparrows would be down in thousands. The field was about 7 acres in extent, and as his full time was required in watching it, the crop, it would be thought, would not be very profitable. However, people who follow dairy farming have to get straw for winter use, and can not abandon cropping altogether simply because the Sparrows make it expensive.

SECTION THIRD.—LIST OF ALL PERSONS WHOSE TESTIMONY APPEARS IN THE BULLETIN.

[NOTE.—This list contains the names of all persons whose testimony has been utilized in the preparation of the Bulletin, whether such testimony was contributed directly to the Department, or had been published already elsewhere. Many persons sent reports, properly signed, but without any indication of their own residence or of the localities to which their testimony related. Such reports could not be used, and the names of the senders do not appear in the list. Of course, no anonymous contributions were used.

The * before the name of a contributor indicates that his testimony was used only, or mainly, in mapping the distribution of the Sparrow; such reports usually came from places which the Sparrow had not then reached.]

Abbot, William Hillsborough, Ill.
Abbott, Albert S., Bellaire, Mich.
Abbott, Dr. J. De Benneville, Bristol, Pa.
*Abbott, R. B., Albert Lea, Minn.
*Abernathy, Jule A., Burnsville, N. C.
Abernathy., J. A., Rhea Springs, Tenn.
Achert, Edward E., Denver, Colo.
Acheson, M. S., Swanwick, Ill.
Ackison, Emma, L., Wellsburgh, W. Va.
Adair, D. L., Hawesville, Ky.
Adair, Jos., Terra Alta, W. Va.
*Adam, Wirt, Jackson, Miss.
Adams, Dr. ——, Framingham, Mass.
Adams, Emma C., East Bethlehem, Pa.
Adams, George H., Beatty, Pa.
Adams, J. W., Springfield, Mass.
Adams, Sarah A., Beatty, Pa.
Adkins, Corwin, Manistique, Mich.
Adney, E. T., Pittsborough, N. C.
*Agersborg, Dr. G. S., Vermillion, Dak.
Aiken, Charles E., Colorado Springs, Colo.
Ailly, Richard d', Malvern, Ark.
Akers, C. B., Emory, Va.
Akhurst, John, Brooklyn, N. Y.
*Albertson, M., Braganza, Ga.
*Alcorn, James P., Kinsley, Kans.
Alderson, J. N., Alderson, W. Va.
Aldrich, A. C., Clare, Mich.
*Aldrich, Charles, Webster City, Iowa.
*Alexander, George D., Shreveport, La.
*Alexander, John P., Plano, Tex.
Alexander, Dr. J. B., Lexington, Mo.
Alexander, J. C., Oak Hill, Ohio.
Alexander, J. D., Thomaston, Ga.
*Alexander, J. E., Enterprise, Fla.
Alexander, J. T., Breckenridge, Mo.
Alexander, W. F., Burkesville, Ky.
Allen, A. T., Denver, Colo.
Allen, C. K., South Windham, Me.
Allen, Dr. C. P., Leech Lake, Minn.
Allen, J. A., Cambridge, Mass.
*Allen, James W., Sheldon, Dak.
Allen, J. C., Olney, Ill.
Allen, J. H., Durham, N. C.
*Allen, L. M., Daingerfield, Tex.
Allen, M. N., Titusville, Pa.
*Allen, Samuel J., Cub Hill, Utah.
Almy, P. M., Siasconset, Mass.
*Alward, J. B., Camden, Mich.
Alwood, William B., Columbus, Ohio.
Ambrose, J. D., Lebo, Kans.
Amburgey, J. F., Lebanon, Va.
Ames, D. D., Avoca, Ark.
Amis, Thos. H., Barboursville, Ky.
*Anderson, C. B., Zumbrota, Minn.
Anderson, G. W., Paxton, Ill.
Anderson, H. W., Laurens C. H., S. C.
*Anderson, John, Tower, Minn.
Anderson, P. D., Kearney, Mo.
Anderson, Thos. F., Dennis Mills, La.
*Anderson, W. B., Millbrooke, Kans.
Andrew, Dr. Geo. L., La Porte, Ind.
*Andrews, J. W., Harrison, Ark.
*Andrews, L. E., Louisville, Colo.
Andrews, W. R., Union City, Tenn.
Andros, Chas. H., Taunton, Mass.
Andrus, F. C., Almont, Mich.
*Angell, F. A., Hawthorne, Nev.
Angus, James, West Farms, N. Y.
Angus, Wm. Cratie, Glasgow, Scotland.
Annis, F. W., Osage, Iowa.
*Anthony, A. W., Denver, Colo.
Apgar, Prof. Austin C., Trenton, N. J.
Apperson, Dr. Jno. S., Town House, Va.
*Applegate, Carrie, Blairstown, Iowa.
Appleton, Geo. Lyman, Ways Station, Ga.
Archer, Charles, Chester Hill, Ohio.
Armstrong, Dr. C. T., Corunna, Mich.
Arnett, John D., Tiptonville, Tenn.

*Arnold, Geo. B., Kasson, Minn.
Arnold, I. N., Richmond, Iowa.
Arnold, L. H., Trenton, Ky.
Arrants, I. C., Decatur, Tenn.
Arundell, C. A., Farmwell, Va.
Asbury, Benj. P., Kingston, Ohio.
Ashby, C. M., Spottsylvania C. H., Va.
Ashby, R. J., Charleston, W. Va.
Ashe, S. A., Raleigh, N. C.
*Ashmead, Wm. H., Jacksonville, Fla.
Ashton, H. C., Flemingsburgh, Ky.
*Askew, T. W. L., Austin, Miss.
Aspinall, W. H., Weston, W. Va.
Astholz, Henry A., Cape Girardeau, Mo.
Atkins, Dr. H. A., Locke, Mich.
Auld, D. J., Sumter C. H., S. C.
Austin, A. C., Oshkosh, Wis.
Austin, E. H., Gaylordsville, Conn.
*Austin, F. C., Orange City, Fla.
Austin, Jane E., Mocksville, N. C.
*Avera, W. F., Camden, Ark.
Avery, J. O., Weston, Ohio.
Avery, Dr. W. C., Greensborough, Ala.
Ayres, John, Medford, Mass.
*Baasen, Francis, New Ulm, Minn.
Babbitt, Clinton, Beloit, Wis.
Babcock, P. O., Monticello, Iowa.
Bacon, I. C., Chase City, Va.
*Bacon, J. M., Oregon City, Oregon.
Bagby, John S., Rushville, Ill.
Bagby, R. A., La Belle, Mo.
Bagg, J. N., West Springfield, Mass.
Bagwell, J. O., Helena, Ark.
Bailey, Alanza A., Evanston, Wyo.
*Bailey, A. B., Malta Bend, Mo.
Bailey, H. B., East Orange, N. J.
*Bailey, J. W., Mulberry, Ark.
*Bailey, M. Milton, Ashland, Kans.
Bailey, Vernon, Elk River, Minn.
Baily, William L., Philadelphia, Pa.
*Baillio, O. P., Liberty, Tex.
Bain, Francis, North River, P. E. I., Canada.
*Bain, H. P., Great Bend, Kans.
Baine, Tom, Hayneville, Ala.
Baines, M. W., Stafford C. H., Va.
Bair, H. C., Punxsutawney, Pa.
Baird, A. B., Hartford, Ky.
*Baird, John R., Johnsonville, Miss.
Bake, Jacob L., Red Oak, Iowa.
Baker, Amos C., jr., New Bedford, Mass.
*Baker, G. W., Olivet, Dak.
Baker, H. C., Hiawatha, Kans.
Baker, H. T., Berlin, Wis.
Baker, James S., Sayville, N. Y.
Baker, L. J., Bowling Green, Va.
Baker, M. D., Uniontown, Pa.
Baker, N. G., Parkersburgh, Iowa.
Baker, W. R., Boonville, Mo.
Balch, W. E., Lunenburgh, Vt.
*Ball, J. A., Belmont, Nev.
Ball, Theo. G., New Worcester, Mass.
*Ballou, E. L., Igo, Cal.
Ballou, W. H., Chicago, Ill.
*Bancroft, E. P., Mankato, Kans.
Banks, J. W., Portland, St. John, New Brunswick, Canada.
*Banner, C. C., Aaron, N. C.
Barber, I. G., Middleburgh, Pa.
*Barber, N. R., Corvallis, Oreg.
*Bardon, John A., Superior, Wis.
Barker, J. M., Fayette City, Pa.
Barkman, Chas. W., Carmichael's, Pa.
Barnard, John, Delphi, Ind.
Barnard & Plank, Deer Creek, Ind.
*Barnes, C., Jonestown, Miss.
Barnes, Joseph, Richmond, South Australia.
Barnes, J. H., Griffin, Ga.
*Barnett, C. G., Henderson, Tex.
Barnhill, B. B., Two Rivers, N. S., Can.
Barns, N. S., Fairmount, W. Va.
Barnum, E. D., Angelica, N. Y.
Barrell, H. F., New Providence, N. J.
Barrell, Robert W., South Bethlehem, Pa.
Barrett, C. S., Charlotte, Mich.
*Barrett, E. F., Aitkin, Minn.
Barrett, W. J., Kinston, N. C.
Barron, T. D., Saint Clair, Mich.
Barrows, Morton, Saint Paul, Minn.
Barrows, Walter B., Washington, D. C.
Barthel, Aug., Belleville, Ill.
Bartlet, Rev. J. Pemberton, Exbury, Hants, Eng.
*Barton, J. M., Cameron, Tex.
Bartram, C. E., Fredonia, N. Y.
*Bassett, S. F., Richmond, Mo.
Bast, Jos., Sheboygan, Wis.
*Batchelder, E. M., Radersburgh, Mont.
*Bateman, R. P., Sheridan, Mont.
*Bates, J. A. T., Oakland, Iowa.
*Bates, J. D., Denton, Tex.
*Baugh, J. J., Des Arc, Ark.
Baum, A. W., Irwinton, Ga.
Baumed, Herman, Johnstown, Pa.
Baxter, Dr. Jas., Chatham, N. B., Can.
Bayard, H. O., Austin, Minn.
*Bayless, T. H., Hope, Ark.
Beach, E. S., Valparaiso, Ind.
Beach, H. D., Coshocton, Ohio.

Beach, L. H., Albion, N. Y.
*Beach, S. J., Farragut, Iowa.
Beal, Prof. F. E. L., Fitchburg, Mass.
Beall, Lee, Rich Hill, Mo.
Beaman, D. C., Ottumwa, Iowa
Beard, D. C., Flushing, N. Y.
*Beard, T. A. C., Crete, Nebr.
Beattie, James, Hillsdale, Mich.
Beatty, Miller, Clarion, Pa.
Beauchamp, Rev. W. M., Baldwinsville, N. Y.
*Beavers, M. M., Waldron, Ark.
*Beavers, R. C., Grundy, Va.
Bebout, A. J., Smithland, Ky.
Becher, E. F., England.
*Beck, Michael, Jordan, Minn.
Becker, Charles, Freeburgh, Ill.
*Becker, Christian, Mount Vernon, Ala.
Beckham, Charles W., Nelson County, Ky.
Beckwith, Charles W., Fredericton, N. B., Can.
*Beckwith, Irenus, Alexandria, Tenn.
*Becdy, N. J., Postville, Iowa.
*Beekman, George, Helena, Minn.
*Beeman, Howard P., Pass Christian, Miss.
*Beers, F. E., Gilmore City, Iowa.
Beeson, H. H., New Market, N. C.
*Beeson, O., Caldwell, Kans.
Beirne, A., Lewisburgh, W. Va.
*Belcher, C. C., Okmulgee, Ind. T.
Belding, L., Stockton, Cal.
Bell, Everett, Trenton, Tenn.
Bell, James, Strathfieldsaye, Hampshire, Eng.
Bell, Prof. James T., Belleville, Ont., Can.
*Bell, John C., Astoria, Oregon.
Bell, J. G., Sparkhill, N. Y.
*Bell, Lucy M., Willis, Tex.
Bell, William P., Accomack C. H., Va.
*Bellamy, Lucas W., Belle Plain, Tex.
Bellows, Charles E., Bridgeton, N. J.
*Beloate, C. R., Corning, Ark.
*Bench, J. M., Coal Hill, Ark.
*Bender, C., jr., Spring, Tex.
Bendire, Capt. Chas. E., Washington, D. C.
Benford, L. J., Ursina, Pa.
Benham, Sidney L., Crescent City, Fla.
*Benjamin, H. R., Tampa, Fla.
*Bennel, B. F., Windsor, Cal.
Benner, H. L., Gettysburgh, Pa.
Benner, J. F., New Lisbon, Ohio.
*Bennett, C. A., Granite Falls, Minn.
Bennett, E. J., Cashiers, N. C.
*Bennett, F. R., Odebolt, Iowa.
*Bennett, L. B., Worthington, Minn.
*Bennett, S. C., Georgetown, Colo.
Bennett, William T., Waterford, Va.
Benson, George W., Atlanta, Ga.
Benson, Lieut. Harry C., Camp Huachuca, Ariz.
Benson, Mary, Hooker, Ind.
Bentley, L. E., Donaldsonville, La.
*Benton, A. H., Madelia, Minn.
*Berger, Charles A., Blunt, Dak.
Bergtold, Dr. W. H., Buffalo, N. Y.
Berkey, E. G., Harristown, Ind.
Berry, Dr. Daniel, Carmi, Ill.
Berry, George H., North Livermore, Me.
*Berry, Henry N., Iowa City, Iowa.
*Berry, Jno., Ozark, Ark.
Berthoud, William B., Barataria, La.
Bessey, Prof. Charles E., Lincoln, Nebr.
Bessmer, John, Hastings, Mich.
Beverly, John James, Woodville, South Australia.
Bibb, J. W., Elsberry, Mo.
*Bibbins, Charles A., Baldwin, La.
Bicknell, Eugene P., Riverdale, N. Y.
Bicknell, Hon. G. A., New Albany, Ind.
*Bielby, C. F. A., De Land, Fla.
*Bienvenu, Albert, Saint Martinville, La.
Bigelow, J. Allen, Pontiac, Mich.
*Bigham, J. A., Tyler, Minn.
Binkerd, Dr. A. D., Cochran, Ind.
*Binnicker, Jno. B., Hampton, S. C.
Binns, Samuel, Fayette, Ohio.
Bird, J. W., Menominee, Mich.
Bird, W. B., King and Queen C. H., Va.
Birt, Thomas, Utica, N. Y.
Bishop, Louis B., New Haven, Conn.
Bivins, J. M. Albemarle, N. C.
*Bjorge, C., Lake Park, Minn.
Blachly, Dr. Charles P., Manhattan, Kans.
*Blain, E. F., Tomichi, Colo.
*Blair, W. H., Montesano, Wash.
Blake, Eli Whitney, 3d, Providence, R.I.
Blakemore, Eugene, Shelbyville, Tenn.
Blakeslee, G. A., Galien, Mich.
Blakiston, T. W., London, Ohio.
*Blakney, G., Carthage, Mo.
*Blandig, Joseph, Convent, La.
Blase, Joseph L., Cynthiana, Ind.
*Blatchford, G. E., Maysville, Colo.
*Bligh, D. C., Minburn, Iowa.
*Blumer, A., Moss Point, Miss.
Boardman, George A., Calais, Me.
Bobbitt, Jno. S., Sussex C. H., Va.

Boblitz, E. L., Mechanicstown, Md.
*Bodet, George, San Diego, Tex.
Bodine, A. L., Plainville, Ohio.
Bodkin, J. T., Patriot, Ind.
Bodley, Dr. A. R., Quenemo, Kans.
*Boemer, Thaddeus, Columbia, Miss.
Bogan, John S., Mount Vernon, Ill.
Bogert, R. V., Beaver Dam, Wis.
*Boggs, Theodore, McPherson, Kans.
Bohl, Daniel, Laurel, Ohio.
Boies, A. H., Hudson, Mich.
Bollman, C. H., Bloomington, Ind.
Bolton, Frank D., New Harmony, Ind.
Bolton, Dr. Tom, San Francisco, Cal.
Bolton, W. P., Liberty Square, Pa.
Bond, Frank, Cheyenne, Wyo.
Bond, Fred T., Vallejo, Cal.
Bond, H. L., Iowa City, Iowa.
Bondman, Jno. F., Brierfield, Ala.
Bondusant, A., Saint Joseph, La.
Bonham, L. N., Oxford, Ohio.
Bonner, Macon, Washington, N. C.
*Bonney, B. S., McPherson, Kans.
*Bonney, James H., Princess Anne C. H., Va.
*Bonney, Miles, Waterproof, La.
*Booth, Henry, Larned, Kans.
*Booth, Joseph S., Missoula, Mont.
Bord, H., Talmage, Nebr.
*Bornarth, Charles, Shakopee, Minn.
Borum, M. V., Dyersburgh, Tenn.
*Borup, Theodor, Fort Custer, Mont.
*Bostwick, Kate, Wesson, Miss.
Bosworth, S. N., Beverly, W. Va.
Boude, J. H., Augusta, Ky.
Boughner, A. V., Greensborough, Pa.
Boulton, William, Alpena, Mich.
Bourk, John, North Bay, Lake Nipissing, Canada.
Bourne, J. D., De Witt, Iowa.
Bowden, S. V., Jamestown, Tenn.
Bowen, C. R., Hinsdale, N. Y.
Bowen, E. A., Middleborough, Mass.
*Bowen, W. S., Sheffield, Iowa.
*Bowers, C. E., Pena Station, Tex.
*Bowers, Dr. Stephen, San Buenaventura, Cal.
Bowie, George R., Ghent, Ky.
Bowles, George John, Montreal, Quebec, Canada.
Bowlus, E. M., Middletown, Md.
Bowman, C. L., Frankfort, Ky.
*Bowman, S. J., Manning, S. C.
Boyce, K., Augusta, Ga.
*Boyd, Dr. Andy, Larkinsville, Ala.
*Boyd, J. N., Cooper, Tex.
*Boyd, R., Kosciusko, Miss.
Boyer, J. W., Independence, Va.
*Boylan, G. W., Hamilton, Dak.
Boyle, Joseph B., Westminster, Md.
Boynton, Dr. C. H., Lisbon, N. H.
Brace, Hiram L., Newaygo, Mich.
*Bracey, W. M., Terry, Miss.
Bracken, P., Parker's Landing, Pa.
Brackett, George E., Belfast, Me.
Brackett, G. B., Denmark, Iowa.
Braden, W. G., New Brighton, Pa.
Braden, W. H., Purdy, Tenn.
Bradford, E., Sparta, Mich.
Brady, Jas, Washington, Pa.
Brady, John, Batavia, Ill.
Brady, Jno, Coalton, Ohio.
*Brady, Thomas T., Beresford, Dak.
Brady, Tom G., Buckhannon, W. Va.
Bragaw, Jno. T., Jersey City, N. J.
*Brambleet, George D., Winchester, Tenn.
*Brandon, T. J., Centreville, Utah.
Brattin, D. W., Brazil, Ind.
Braund, S., Adelaide, South Australia.
Braymer, Dr. Frank H., West Pawlet, Vt.
Breaden, J. C., Butler, Pa.
Breeding, Hon. Green, Booneville, Ky.
*Breeman, William J., Sidney, Nebr.
Breen, Edw. J., Weston, Mo.
Brewer, H. C., Huntingdon, Tenn.
Brewer, Dr. T. M., Boston, Mass.
Brewerton, Thomas W., Willard, Utah.
*Brewster, J. O., Hunnewell, Kans.
Brewster, William, Cambridge, Mass.
Brice, A. C., Lenox, Iowa.
*Brice, J. C., Arcadia, La.
Brice, William, Ithaca, Mich.
*Bridgewater, W. L., Bandana, Ky.
Briechner, J. A., Taneytown, Md.
Briggs, F. P., Hudson, Me.
*Brill, Fred., Lincoln, Mo.
Brimley, Clement S., Raleigh, N. C.
Briner, J. H., Hazelton, Ind.
Brinker, J. H., West Point, Miss.
Brinkley, L. L., Edenton, N. C.
Brittain, John, Petitcodeac, New Brunswick, Canada.
*Brittain, J. B., Jacksonville, Tex.
Broad, Henry, Marden, South Australia.
Brodhead, E. A., Kittanning, Pa.
Brodie, John N., Bear Lake, Mich.
Brodie, Dr. William, Toronto, Canada.
Bronson, Graham, Vernon Centre, N. Y.
Brooks, Edward, Boston, Mass.
Brow, S. A., Lancaster, Wis.

Browe, W. C., Salt Lake City, Utah.
*Brown, D. B., Goodwater, Ala.
Brown, E. L., Durand, Wis.
Brown, E. L., Eufaula, Ala.
Brown, F. H., Renfrew, Pa.
*Brown, George B., Fredonia, Kans.
*Brown, Herbert, Tucson, Ariz.
Brown, H. E., Dublin, Tex.
Brown, Julia B., Markland, Ind.
Brown, J. M., Galveston, Tex.
Brown, Dr. J. P. H., Augusta, Ga.
Brown, J. R., Queen City, Mo.
*Brown, J. William, Bastrop, La.
*Brown, Mary A., Hillsborough, Oregon.
Brown, M. E., Bethany, W. Va.
Brown, Nathan Clifford, Portland, Me.
*Brown, Robert L., Austin, Ark.
Brown, Will A., Pikeville, Tenn.
Browne, F. C., Framingham, Mass.
Brownley, A. M., Franklin, Va.
Broyles, W. T., Dayton, Tenn.
*Brugh, M. P., Eutaw, Ala.
Brunson, W. H., Edgefield C. H., S. C.
Brunt, John R., Osage Mission, Kans.
Bruton, W. P., Dover, Tenn.
*Bryan, I. W., Dillon, Ga,
Bryant, Walter E., Oakland, Cal.
Brydia, C. S., Sannemin, Ill.
*Buck, Adam, Henderson, Minn.
Buck, A. J., Oskaloosa, Kans.
*Buckner, Louis, Newellton, La.
Budd, Henry I., Mount Holly, N. J.
*Buddecke, A. E., Montrose, Colo.
*Budge, Annie, Paris, Idaho.
Buffington, J. F., New Windsor, Md.
Bunnewitz, L., Wolcott, Iowa.
Bunsen, George C., West Belleville, Ill.
*Burbank, H. A., Laredo, Tex.
Burbank, J. A., Welcome, La.
Burger, S. N., Manchester, Tenn.
Burhans, Howard, Heath, N. Y.
Burke, W. A., Staunton, Va.
Burleigh, County Commissioner, New Haven, Conn.
*Burley, T. S., Walhalla, Dak.
Burmeister, Charles, Frankfort, Mich.
Burns, Frank L., Berwyn, Pa.
*Burns, John J , Sprague, Wash.
*Burns, J. T., Dayton, Wash.
Burns, Robert, Houston, Tex.
Burns, William, Port Huron, Mich.
*Burr, R. H., Bartow, Fla.
*Burrell, H. P., Elk River, Minn.
Burrough, Edward, Merchantville, N. J.
*Burroughs, C. H., La Crosse, Wis.
Burrow, W. J., Plymouth, Mich.
Burt, Sam. W., Salem, Ala.
Burtis, Henry M., Port Washington, N. Y.
Burton, Ruth C., Taylorsville, Ky.
*Burwell, D. M., Minnetonka, Minn.
Buskirk, J. B., Logan C. H., W. Va.
Butcher, S. J., Burlington Junction, Mo.
Butler, Amos W., Brookville, Ind.
Butler, Charles H., Paw Paw, Mich.
*Butler, F. G., Schaller, Iowa.
Butler, S. M., Clifton Forge, Va.
Butterworth, T., Quincy, Ill.
Button, Charles W., Lynchburgh, Va.
*Butts, E. G., Stillwater, Minn.
Butz, William T., New Castle, Pa.
Buxton, C. L., England.
Byars, Jas., Covington, Tenn.
Byram, R. R., Lena, Wis.
*Byrne, M. E., Enterprise, Miss.
*Byrnes, J. M., Brenham, Tex.
Byrum, George B., Laconia, Ind.
*Cabeen, J. H., Belleview, La.
*Cage, John W., Mineola, Tex.
Cahoon, John C., Taunton, Mass.
*Cain, M. G., Seymour, Iowa.
Calderwood, M. H., Eldridge, Iowa.
Caldwell, L. W., Warrenton, Va.
Calohan, Mary M., Edenburgh, Va.
Calvin, John H., Rosewood, Ind.
*Calvin, T. W., Lake View, Oregon.
Cameron, J. D., Asheville, N. C.
Camp, Robert D., New Haven, Conn.
Campbell, Altes H., Iola, Kans.
Campbell, George W., Delaware, Ohio.
Campbell, H. D., Traverse City, Mich.
Campbell, Isabella, Blairsville, Pa.
Campbell, James L., Boyne City, Mich.
Campbell, John, Flint, Mich.
Campbell, M. J., Fontana, Kans.
Campbell, O. L., Knoxville, Ill.
*Campbell, Thomas, Medical Lake, Wash.
Camper, C. B., Fincastle, Va.
Candland, A. W., Chester, Utah.
*Cannon, James, Mankato, Minn.
*Cannon, Walter R., Norton, Kans.
*Cannon, William, Fort Abraham Lincoln, Dak.
*Canon, W. H., Merrill, Wis.
Cantwell, James S., Smithfield, Utah.
*Caragan, William H., Young's Spring, Ky.
*Caraway, J. H., Ronceverte, W. Va.
Card, Ira B., Hillsdale, Mich.
*Card, L. A., Big Stone City, Dak.
Carder, T. M., Dallas, Ark.
*Cardwelt, W. D., Jackson, Ky.

Carew, Joseph W., Hahnville, La.
*Carey, G. W., North Yakima, Wash.
Carey, John H., Morristown, Ohio.
Carlin, James, Cleves, Ohio.
Carmine, J. W., Boston, Ga.
Carpenter, Charles M., Providence, R. I.
Carpenter, F. H., Rehoboth, Mass.
Carpenter, H. O., Coe Ridge, Ohio.
Carper, John C., New Castle, Va.
*Carr, Isaac T., Neillsville, Wis.
Carr, R. F., Tazewell, Tenn.
*Carr, S. A., Galena, Mo.
*Carrington, J. F., Elizabethtown, N. Mex.
Carrithers, C. F. H., Fairbury, Ill.
Carroll, John, West St. Louis, Mo.
Carroll, Patrick, Lonaconing, Md.
Carryl, F. M., Passaic Bridge, N. J.
Carter, Alonzo H., Hardin, Ill.
Carter, Charles W., Aledo, Ill.
*Carter, D. M., Hattiesburgh, Miss.
*Carter, John H., Harrisonburgh, La.
*Carter, M. A., Pine Apple, Ala.
*Carter, M. E., Fort Bridger, Wyo.
Cartwright, E. G., La Fayette, Tenn.
Carver, A. H., Lickley Corners, Mich.
Case, G. L., Austin, Minn.
*Case, Jennie L., Asotin, Wash.
Case, Jesse G., Peconic, N. Y.
*Case, J. B., Paradise Valley, Nev.
Casey, M. J., Vail, Iowa.
Caskey, John O., Enon Valley, Pa.
Cate, Clarence L., Spencer, Mass.
Cate, G. W., Stevens' Point, Wis.
Caulkins, Dr. John S., Thornville, Mich.
*Cave, S. H., Terrance, Utah.
Cayton, William M., Saint George, W. Va.
*Chaffe, J. C. T., Minden, La.
Chalfant, Thomas, Danville, Pa.
Chalmers, Thomas, Holyoke, Mass.
Chamberlain, Montague, St. John, N. B., Canada.
Chamberlain, M. A., Winthrop, Iowa.
Chambers, John, South Richmond, South Australia.
*Champion, H., Breckenridge, Minn.
*Chandler, R. P., Riverside, Cal.
Chapin, B. T., Brockwayville, Pa.
Chapin, Rev. D. D., Allegan, Mich.
*Chapman, Adkins, Wayne C. H., W. Va.
*Chapman, Frank M., Gainesville, Fla.
*Chappelear, R. H., Boggy, Ga.
Charles, Alex., Cedar Rapids, Iowa.
Chase, Edward R., Corinne, Utah.
Chase, S. B., Osage, Iowa.
*Chatfield, E. E., Belle Plaine, Minn.
Cheatham, Mrs. Anna B., Nashville, Tenn.
*Cheney, S. F., Woodward's Cove, Grand Manan, N. B., Canada.
Cherrie, George K., Knoxville, Iowa.
Chesney, Isom, Percy, Ill.
*Chessher, D. T., Georgetown, Tex.
Chichester, Andrew, Amityville, N. Y.
*Childs, F. C., Leesburg, Fla.
Chisman, Mattie K., Hampton, Va.
Christian, L. A., Mount Gilead, N. C.
*Christlieb, B. F., Long Lake, Minn.
*Christy, J. C., Silver City, Iowa.
Church, A., New York, N. Y.
Church, A. M., Boonville, N. Y.
*Churchill, Arthur, Rugby, Tenn.
*Churchill, C. P., Linn Creek, Mo.
Clapp, Charles M., Albion, Ind.
Clapp, W. C., Dorchester, Mass.
*Clark, A. K., jr., Hugo, Colo.
*Clark, A. M., Spencer, Tenn.
*Clark, Edwin B., Waxahachie, Tex.
Clark, Frank D., Farmington, Mich.
Clark, George A., Bloomsburgh, Pa.
*Clark, George W., Lyons, Kans.
Clark, Harvey, Butler, Mo.
Clark, Hubert L., Amherst, Mass.
Clark, J. D., Brookfield, Ohio.
Clark, J. R., La Grange, Ky.
*Clark, L. B., Newton, Tex.
Clark, Mrs. M. A., Falmouth, Ky.
*Clark, M. A., Giddings, Tex.
Clark, N., Baltimore, Md.
Clark, W. C., Paducah, Ky.
*Clark, W. H., jr., Florence, Wis.
*Clark, S. H., Elwood, Iowa.
Clark, S. M., Washington, D. C.
*Clark, S. N., Cleburne, Tex.
Clarke, James W., De Soto, Mo.
Clarke, John G., West Kingston, R. I.
*Clay, C. M., Blue, Utah.
Claypole, Prof. E. W., Akron, Ohio.
Claywell, J. A., Morganton, N. C.
Clement, Asa, Dracut, Mass.
Clement, Paul A., Cumming, Ga.
Clements, Shannon, Bucyrus, Ohio.
*Cleveland, C. B., Linden, Ala.
Clevenger, William, Wilmington, Ohio.
Clifford, J. Philip, Clarksburgh, W. Va.
Clinton, John, Brownsville, Tenn.
*Clopton, Frank B., Pendleton, Oregon.
Coale, H. K., Chicago, Ill.
Coatz, Thomas C., North Royalton, Ohio.
Cobleigh, W. S., Peoria, Ill.
*Cochran, John H., Dallas, Tex.

Cochran, J. L., Strong, Kans.
*Cochran, Mrs. Maria S., Brazoria, Tex.
Cochrane, J. D., Dexter, Me.
Cocke, Peyton A., Surry Court-House, Va.
*Cocke, Thomas R., Victoria, Tex.
*Coffee, M. E., Burnet, Tex.
Coffin, A. V., Le Roy, Kans.
Coffroth, J. K., Somerset, Pa.
Cogan, Ella J., Montello, Wis.
Cohoon, J. A., Effingham, Kans.
Colam, John, England.
Cole, Beaumont, Adelaide, South Australia.
Cole, H. D., Williamsburgh, Va.
Coleman, W. E., Jefferson City, Mo.
*Colin, Lehman, Lee, Miss.
Collins, C. F., Homer, Mich.
*Collins, Daniel R., Cherry Creek, Nev.
Collins, D. K., Charleston, N. C.
*Collins, W. V., Gonzales, Tex.
*Colson, Herman, Ionia, Kans.
Colston, Wm. B., Martinsburgh, W. Va.
Comeau, Napoleon A., Godbout, Quebec, Canada.
Comstock, Prof. F. M., Le Roy, N. Y.
*Conatser, W. S., Palo Pinto, Tex.
Conklin, J. B., Springport, Mich.
Conklin, W. A., New York, N. Y.
Conn, James H., Saint John's, Mich.
*Conner, I., Ponca, Nebr.
*Connor, James C., Aspen, Colo.
Connor, J. T., Rome, Ind.
Connst, J. L., Flemington, N. J.
*Conrad, V. M., Lewis, Iowa.
Cook, A. J., Agricultural College, Mich.
*Cook, Barbara E., Bowie, Tex.
*Cook, B., Arkadelphia, Ark.
*Cook, E. G., Fullerton, Nebr.
*Cook, Geo. F., Breckenridge, Minn.
Cook, John, Bridgeport, Ohio.
Cook, P. J., Cullom, Ill.
*Cook, Thos. F., Monrovia, Kans.
Cook, W., Bowling Green, Ky.
Cooke, Michael, Derby, Kans.
*Cooke, T., Clear Creek, Tex.
*Cooksey, W. H., Geneva, Nebr.
Cooper, D. W., Bellaire, Ohio.
Cooper, Joseph, Greenville County, S. C.
Cooper, Dr. J. G., Haywards, Cal.
*Cooper, Martin, Forest City, Iowa.
Coram, J. H., Morgan, Ga.
Cordeaux, John, Ulceby, North Lincolnshire, England.
Corning, Erastus, jr., Albany, N. Y.
Coryell, R. J., Jonesville, Mich.
Costellow, C. W., Waterborough, Me.
Cottingham, F. G., Sharon Centre, Ohio.
Cottrell, A., Morrill, Kans.
Cottrell, J. F., Fort Scott, Kans.
Couch, Edward J., Ridgefield, Conn.
Coues, Dr. Elliott, Washington, D. C.
Couk, John M., Jonesville, Va.
Council, M. B., Americus, Ga.
Coutant, Chas. K., Omaha, Nebr.
Covell, J. D., Forreston, Ill.
Cowing, Granville, Muncie, Ind.
*Cox, A., Blossburgh, N. Mex.
Cox, Chas. C., Wampum, Pa.
Cox, Jas., Grand Rapids, Mich.
*Cox, W. A., Ellijay, Ga.
Cox, W. A., Munising, Mich.
*Cox, W. L., Genoa, Nev.
Cozatt, E. W., Madisonville, Tenn.
*Crabtree, S. H., Rohnerville, Cal.
Craig, J. P., Memphis, Mo.
*Craig, M. A., El Dorado, Ark.
Craig, W. T., San Francisco, Cal.
Craig, Rev. Dr., Mt. Gambier, S. Australia.
*Craiyo, James T., Paris, Tex.
*Cramer, A. P., Avoca, Iowa.
Cramer, Stephen, Batavia, Ohio.
Crandall, W. W., Chippewa Falls, Wis.
Crane, F. W., Maquoketa, Iowa.
Crane, L. E., Millet, Mich.
Crane, Marcus S., Caldwell, N. J.
Crawford, Chas. B., Mifflintown, Pa.
Crawford, Jas. C., Cameron, W. Va.
*Crawford, J. J., Nevinville, Iowa.
*Crawford, T. B., Grand Junction, Colo.
*Crawford, Thos. W., Gainesville, Ark.
Crisp, John D., Holden, Mo.
Criss, R. D. Melvern, Kans.
Critchett, Jas. C., Monroe, Mich.
Critchfield, M. L., Oskaloosa, Kans.
Crites, S. D., Elida, Ohio.
Crittenden, H. H. W., Burkeville, Va.
Crittenden, S. S., Greenville, S. C.
*Crocket, B. D., San Augustine, Tex.
*Cromastic, A. K., Clarkton, N. C.
*Crook, W. R., Falls City, Nebr.
Crosland, Jas. E., Aiken, S. C.
Crosland, T. L., Bennettsville, S. C.
Cross, William T., Gatesville, N. C.
Crotsenburg, C. N., Clinton, Wis.
Crowell, W. D., Newport News, Va.
Crowl, H. R., Winton Place, Ohio.
Crown, S. C., Hancock, Md.
Crozier, Hon. John, Oaklands, South Australia.
Crozier, William, Northport, N. Y.

*Cruickshank, Mrs. S., Clay Center, Nebr.
Crum, N. W., Inez, Ky.
Cruzen, G. R., Stafford, Kans.
Cueny, J. E., Cheboygan, Mich.
Cullingworth, William H., Richmond, Va.
Cullom, D. W., Celina, Tenn.
Culp, J. F., Athens, Mich.
Culpepper, Miss Etta, Camilla, Ga.
Cunningham, Hon. John D., Atlanta, Ga.
*Cunningham, J. C., Muldon, Miss.
*Cunningham, J. M., Henderson, Tenn.
*Cunningham, J. R., Coffeysburgh, Mo.
Cunningham, W. T., Danville, Ill.
Curnow, J., Adelaide, South Australia.
*Currie, George W., Raleigh, Miss.
*Curry, Hamilton, Cloquet, Minn.
*Curtis, Charles D., Helena, Mont.
Curtis, F. D., Charlton, N. Y.
*Curtis, George W., College Station, Tex.
Curtis, John, New Liberty, Ky.
Curtiss, Robert W., Stratford, Conn.
*Cusaday, W. H., Orange City, Iowa.
Cutcheon, F. M., Portland, Mich.
Cuthbert, F. T., Minneapolis, Minn.
Cutler, B. L., West Jordan, Utah.
*Cutler, H. D. B., Glenwood, Mo.
*Cutter, John J., Parker, Dak.
Cutting, Dr. Hiram A., Lunenburgh, Vt.
Daggett, Alonzo, Cuttyhunk, Mass.
Daine, E. A., Hyde Park, Utah.
Dakin, J. A., Tully, N. Y.
*Dale, W. T., Mellette, Dak.
Dall, W. H., Tampa, Fla.
*Daniel, Moses, Brunswick, Ga.
Daniels, Jas. S., Jerseyville, Ill.
Danley, W. H., Antigo, Wis.
*Darling, A. L., Brownsville, Minn.
*Darling, T. C., Eudora, Kans.
Dashiell, R. R., Jackson, Tenn.
*Daugherty, D. B., Boone, N. C.
Daugherty, G. W., Carmichaels, Pa.
*Daus, L. L., Rock Springs, Wyo.
Davenport Academy of Natural Sciences, Davenport, Iowa.
Davies, A. P., Gloucester C. H., Va.
Davies, L. M., Cleveland, Ohio.
*Davis, A. B., Winnebago, Minn.
Davis, Charles A., Burlington, Vt.
Davis, D. J., Wapakoneta, Ohio.
Davis, E. H., Keyser, W. Va.
Davis, George A., Mexico, N. Y.
Davis, Hugh L., Richmond, Va.
*Davis, H. T., Orange, Tex.
Davis, John, Ridgeway, Ohio.
Davis, John M., Rochester, Ind.
Davis, Jno. M., Waynesville, N. C.
Davis, J. H., Tallapoosa, Ga.
*Davis, J. J., Salem, Utah.
*Davis, J. M., Ranger, Tex.
*Davis, Luciana G., Rio Grande City, Tex.
*Davis, M. Allie, Bolton's Depot, Miss.
Davis, S. R., Creston, Iowa.
*Davis, W. T., Erwin, Tenn.
Davison, J. L., Lockport, N. Y.
*Dawson, John W., Phillipsburgh, Mont.
Dawson, William R., Tidioute, Pa.
Day, H. S., Parkersville, Kans.
*Dearborn, M., Wayne, Nebr.
Deaton, J. L., Pocahontas, Va.
*Decker, A. F., Sweet Water, Tex.
Deemer, H. E., Red Oak, Iowa.
*Deguire, A. A., Fredericktown, Mo.
Deighan, F. A., Castalia, Ohio.
*Deimling, Mary, Virginia, Mont.
De Lassus, Joe R., Perryville, Mo.
Delknap, J. H., Omer, Mich.
Dempsey, J. F., Madisonville, Ky.
Dendy, Charles L., Hamilton, Ga.
Denise, D. D., Freehold, N. J.
Dennen, L. W., Havensville, Kans.
Dennis, David B., Coldwater, Mich.
*Dennison, Hattie, Vancouver, Wash.
*Dennison, W. B. Litchfield, Kans.
Dent, F. Mortimer, Newburgh, W. Va.
Dent, W. W., Marquette, Mich.
Denton, E. P., Bagdad, Ky.
*Denton, F. D., Batesville, Ark.
*Derrick, J. A., Pittsburgh, Tex,
Dessert, F. A., Macon City, Mo.
Detweiler, Dr. J. F., Wadsworth, Ohio.
Deutsch, Peter J., Magnolia, Ind.
Davanney, Mrs. Maria, Glendale, Ohio.
Devier, H. K., Dayton, Va.
De Wald, Henry, Collinsville, Ill.
De Wolf, Samuel, Rochester, Minn.
Dibrell, W. L., Sparta, Tenn.
Dick, A. M., West Newton, Pa.
Dickinson, C. L., Somerville, Tenn.
Dickinson, Monroe, Boyne Falls, Mich.
*Dickinson, S. S., Larned, Kans.
Dickson, H. D., Neosho Falls, Kans.
*Didlake, J. T., Hepler, Kans.
Diehl, E. P., Olathe, Kans.
Dimmick, C. W., Milford, Pa.
Dingman, W. E., Newton, Iowa.
Dixwell, Dr. John, Boston, Mass.
Doan, A. J., Jersey City, N. J.
Doan, W. D., Atglen, Pa.
*Dobie, Malcom, Hayward, Wis.
Doertenbach, William F., Cleveland, Ohio.

*Dollerhide, R. H., Delhi, La.
*Dols, Henry, Merriam Junction, Minn.
Donaldson, George, Ithaca, N. Y.
*Donaldson, J. C., Gilbertsville, N. Y.
*Donkersley, J. H., Laramie City, Wyo.
*Donnell, J. K., Greenbrier, Ark.
*Donnell, Martin W., Iona, Minn.
*Dorier, L., Ocala, Fla.
Dorman, David, Independence, Iowa.
Dorr, George P., Woodsfield Ohio.
Doty, H. F., Reading, Mich.
*Douden, B., Roseburgh, Oregon.
Dougall, H. M.,Springville, Utah.
*Dougherty, John, Sebastopol, Cal.
Doughty, William M., Cedar Point, Kans.
Douglas, Henry, Happy Valley, South Australia.
*Douglas, John H., Lamar, Mo.
Douthat, William B., Fayetteville, Tenn.
Douthit, G. B., Jacksonville, Ala.
*Dowlin, Paul, Greenfield, Iowa.
*Doyal, M. C., Harwood, Tex.
Doyle, D., Oswego, Kans.
Doyle, Thomas, Sandusky, Mich.
Dreker, Darius, Stroudsburgh, Pa.
Dresser, J. M., La Fayette, Ind.
Drew, Stod E., Midland, Mich.
*Dubberly, J. A., Tallassee, Ala.
*Dubois, M. Gue, Marion C. H., S. C.
*Duclos, Alphonse, Rayne, La.
Dudenbostel, Aug. Campbell Hill, Ill.
Dudley, R. S., Pulaski Station, Va.
Duff, J., England.
*Duffy, A. A., Matagorda, Tex.
Duffy, J., Lancaster, Pa.
*Duggan, James, Melrose, Iowa.
Duke, Samuel, Notasulga, Ala.
Dulaney, Hon. W. L., Louisville, Ky.
Dunbar, E. W., Damariscotta, Me.
*Duncan, John W., Bonham, Tex.
Duplanty, Frank, Whittemore, Mich.
Du Prè, J. F. C., Abbeville C. H.. S. C.
Dupuy, Charles E., Plaquemine, La.
*Dupuy, H., Marksville, La.
Dupuy, Nelson, North Adams, Mass.
*Duran, Dana, Huron, Dak.
*Durbin, J., Lisbon, Dak.
Durfee, Owen, Brooklyn, N. Y.
Durham, Dr. G. W., Thomson, Ga.
Durkin Michael, Washington, D. C.
Dury, Charles, Avondale, Ohio.
Dusenberg, Mary R., Concord, N. C.
Duvall, M. W., Cheraw, S. C.
*Duvar, J. Hunter, Alberton, Prince Edward's Island, Canada.
*Dwelley, J. F., La Conner, Wash.
Dwinelle, C. H., Berkeley, Cal.
Eames, Frank M., Bay Ridge, N. Y.
Earnest, F. W., Jonesborough, Tenn.
*Eastgate, T. F., Larimore, Dak.
*Eastland, Hi, Forest, Miss.
Eaton, Caleb C., Montpelier, Vt.
*Ebbs, F. C., Marshall, N. C.
*Echols, W. T., Cotton Plant, Ark.
*Eckhard, W. L., Victor, Iowa.
*Eddy, Henry, Henrietta, Tex.
Edmonds, W. F., Estillville, Va.
*Edmondson, C. M., Williamsburgh, Miss.
Edmondson, R. H., Halifax C. H., Va.
Edwards, A. G., Kingsley, Mich.
Edwards, A. J., Hillsborough, Ill.
Edwards, John F. T., Ironton, Mo.
Edwards, P. J., Hillsborough, Ill.
*Edwards, S. M., Argusville, Dak.
*Edwards, Thomas, Bath, Dak.
Edwards, W. W., New Orleans, La.
Egerton, J. L., Hendersonville, N. C.
Eggleston, B. P., Smithville, Va.
Egleston, D., Winnsborough, S. C.
*Elder, M. W., Garfield, Kans.
*Elder, W. A., Woodville, Miss.
*Eley, Charles N., Smith's Point, Tex.
Elgar, William H., Platteville, Wis.
Eller, W. H., Blair, Nebr.
Elliot, N. A., Mansfield, Pa.
Elliott, Henry W., East Rockport, Ohio.
Elliott, R., Plover Mills, Ontario, Canada.
Ellis, Alfred, Leicester, England.
*Ellis, M. J., Encinal, Tex.
Ellison, T. W., West Union, Ohio.
Ellsberry, B. F., Ironton, Ohio.
*Elson, Alex., Unionville, Mo.
Elvins, Richard, Belleville, Ontario, Canada.
Elwyn, A. L., Philadelphia, Pa.
Ely, T. D., Alma, Mich.
*Embree, David B., Barclay, Kans.
Emerson, Levi H., Vassar, Mich.
Emerson, Oliver, Parma, Ohio.
Emerson, T. W., Saint Clairsville, Ohio.
Emerson, W. Otto, Haywards, Cal.
Emery, Henry D., Chicago, Ill.
Engle, E. B., Waynesborough, Pa.
Engman, E. J., Concession, La.
*Ennis, John B., Monument, Kans.
*Eno, I. L., Indianola, Iowa.
Enos, E., Waukesha, Wis.
Erdice, Laselle R., Brookville, Pa.
*Ernsperger, F. B., Cambria, Wis.
Ernst, J. L., Petersburgh, Ohio.

Escott, J. T., Big Rapids, Mich.
*Espey, S. M., Windom, Minn.
*Estes, W. C., Neligh, Nebr.
Etheridge, Anthony, Norwood, South Australia.
*Etienne, A. B., Centreville, La.
Ettmueller, Gustav, Hermann, Mo.
*Eubank, C., Poncho Springs, Colo.
Evans, G. J., Hastings, Nebr.
Evans, H. C., Bloomfield, Iowa.
Evans, John C., Saint Joseph, Mo.
Evans, J. H., Wabasha, Minn.
Eveland, F., Ferry, Iowa.
*Everett, H. C., Forsyth, Mo.
Everhard, A., Ripon, Wis.
Everly, J. O., South Carrollton, Ky.
Evermann, Prof. B. W., Terre Haute, Ind.
*Everts, E. L., Menomonie, Wis.
Ewart, John, Yarker, Ontario, Canada.
*Fain, George, Elk Falls, Kans.
Fairbanks, Arthur, Hanover, N. H.
Fairbanks, Rev. Henry, Saint Johnsbury, Vt.
Fairbrother, Thomas, Fullarton, South Australia.
Fairchild, H. L., Midland, Mich.
*Fallas, William E., Reinbeck, Iowa.
Farley, P. R., Hicksford, Va.
Farmer, Andrew J., Hartville, Mo.
Farmer, H. H., Hillsville, Va.
*Farmer, I. M., Le Sueur, Minn.
Farnsley, A. P., Louisville, Ky.
*Farrar, John H., Evans, Colo.
Farrell, F. M., Barboursville, W. Va.
*Farrow, A. U., Cuba, Mo.
Faucette, E. W., Milton, N. C.
*Fay, E., Moorhead, Minn.
*Feamside, M. B., Tillamook, Oregon.
*Fee, T., Mendota, Minn.
*Feild, Julian, Fort Worth, Tex.
*Feildes, John, Jackson, Minn.
Fellers, Z., Princeton, W. Va.
Fenn., E. D., Nevada, Iowa.
Fenton, W. A., Morristown, Ohio.
*Fergerson, W. R., Smithville, N. C.
Fergus, R. A., Lewisburgh, Tenn.
*Ferguson, D. A., Richmond, Tex.
*Ferguson, J. A., Doniphan, Mo.
*Ferguson, J. P., Augusta, Ark.
Fernald, Prof. C. H., Orono, Me.
Ferreira, Alexander, Fort Schuyler, New York Harbor.
Ferriman, George, Albion, Ill.
Ferriss, Hon. John C., Nashville, Tenn.
Ferry, L. C., Northampton, Mass.
Fiebig, Charles, Eureka, Cal.
*Field, C. C., Puyallup, Wash.
Field, John, Cloverdale, Cal.
Filmer, Thomas, Glenelg, South Australia.
Fincher, W. J., Carnesville, Ga.
Finden, Mr., Salisbury, South Australia.
Finlay, John S., Holly Springs, Miss.
Finley, Edward, Hartford, Mich.
*Finn, John, Decorah, Iowa.
Fisher, A. J., Ferdinand, Ind.
Fisher, Dr. A. K., Washington, D. C.
*Fisher, Charles A., Aberdeen, Dak.
*Fisher, F. P., Onawa, Iowa.
Fisher, Dr. George J., Sing Sing, N. Y.
Fisher, Henry, Lee, Ohio.
Fisher, H. L., York, Pa.
Fisher, Morman, Huntingburgh, Ind.
Fisher, T. Scott, East Brook, Pa.
Fisher, William C., Patoka, Ind.
Fisher, William Hubbell, Cincinnati, Ohio.
*Fitzpatrick, C. J., Aplington, Iowa.
Flagg, George H., Charlestown, W. Va.
*Flamin, Henry, Rexburg, Idaho.
*Fleming, W. J., Fort Smith, Ark.
*Flinn, Samuel, White Cloud, Kans.
*Florer, Dr. Thomas W., Waxahachie, Tex.
*Flournoy, B. W., Bennington, Kans.
*Floyd, F. C., Locksburgh, Ark.
Floyd, H. H., Abilene, Kans.
Floyd, Patrick W., Burlington, Kans.
*Flynn, David C., Advance, Mo.
*Flynn, John, Duluth, Minn.
*Foote, J. A., Anoka, Minn.
*Forbes, C. E., Saint Paul, Nebr.
Forbes, Frank T., Fredericksburgh, Va.
Forbes, Prof. S. A., Normal, Ill.
Ford, A., Bronson, Kans.
*Ford, F. P., West Union, W. Va.
*Ford, G. W., Baldwin, Fla.
Forsyth, J. C., Northumberland, Pa.
Fosdick, Weldon F., Hackensack, N. J.
*Fosket, Mark, Howard, Minn.
Foster, E. H., Traverse City, Mich.
*Foster, J. A., Marquette, Kans.
Foster, L. S., New York, N. Y.
Foster, Sarah H., Portsmouth, N. H.
Foster, T. W., Palmyra, Nebr.
*Foster, William, South Lake Weir, Fla.
Fowlkes, J. M., Memphis, Tenn.
*Frakes, David, Ouray, Colo.
Francis, F. M., Davisborough, Ga.
Francis, Nathaniel A., Brookline, Mass.
Francis, W., Ackley, Iowa.

Frank, Jno. L. H., Dayton, Ohio.
*Fraser, Alex., Irwin, Colo.
Frazar, M. Abbott, Mount Auburn, Mass.
Frazier, F. M., Lost Nation, Iowa.
Freeman, C. W., Brookfield, Mo.
Freeman, J. D. B., New London, Mo.
Freet, Jacob H., Wrightsville, Pa.
Freke, Percy Evans, Dublin, Ireland.
*French, C. H., Lakeville, Minn.
French, George H., Davenport, Iowa.
French, Prof. G. H., Carbondale, Ill.
*French, Mary F., Shawano, Wis.
Fribley, E., New Philadelphia, Ohio.
Friedman, J. F., Jasper, Ind.
*Friend, Jno. C., Rawlins, Wyo.
*Frierson, C. J., Frierson's Mill, La.
Frink, Harry A., Bucksport, Me.
*Frink, J. O., Taylor, Tex.
Fritz, A. S., Burdickville, Mich.
Fritz, J. H., Somerset, Pa.
Frye, F. W., Parsons, Kans.
*Fryer, H. C., Blakely, Ga.
Fuller, Charles B., Portland, Me.
Fuller, S. R., Eaton Rapids, Mich.
Fulmer, J. H., Muncy, Pa.
*Fulton, L. J., Casselton, Dak.
*Furguson, Adam, North Platte, Nebr.
Furlow, W. C., Americus, Ga.
*Furman, C. W., Bolivar, Mo.
Furman, H. S., Franklinton, N. C.
Fytche, Lewis, Lincolnshire, England.
Gaddis, Thomas B., Martinsville, Ohio.
Gaddy, R. B., Polkton, N. C.
Gadsden, R. W., Dyersville, Iowa.
*Gaffney, F. O., Lake City, Mich.
*Gage, W. D., Gurdon, Ark.
Galbraith, A. T., Flora, Ill.
Gall, D. W., Philippi, W. Va.
Gall, John, Wright's Grove, Ill.
Gallagher, C. A., Cheboygan, Mich.
*Gallagher, John, Minto, Dak.
*Gallaway, C. C., Kildare, Tex.
Gallup, J., Strongsville, Ohio.
Gamble, Levi, Warsaw, Ohio.
Gans, M. L., Moundsville, W. Va.
*Gardiner, D. S., Downs, Kans.
Gardner, F. H., Columbus, Ky.
Gardner, J. C., Big Rapids, Mich.
Gardner, M. E., Jamestown, Pa.
Gardner, R. M., Christiansburgh, Va.
Garfield, Charles W., Grand Rapids, Mich.
Garing, John F., White Sulphur Springs, W. Va.
*Garlick, David, Independence, Wis.
*Garner, R. M., Comanche, Tex.
*Garner, W. M., Quitman, Ark.
*Garnett, L. M., Mathews, Va.
*Garrett, I., Monroe, La.
Garrett, L. S., West Point, Va.
Garrison, C. F., Fort Branch, Ind.
*Garrison, J. W., Sac City, Iowa.
Garrison, Lloyd McKim, Orange, N. J.
Garth, S. D., Clinton, Mo.
Gartside, D. D., O'Fallon Depot, Ill.
Garvin, W. O., Trenton, Mo.
*Garwood, John W., Monticello, Fla.
Gary, T. A., Galveston, Tex.
Gault, B. T., Chicago, Ill.
Gault, W. S., Marysville, Pa.
Gay, William M., Wilson, N. C.
*Gaylord, George A., Tail Point Light Station, Wisconsin.
Gaylord, H. J., Binghamton, N. Y.
Geduldig, G., Norwich, Conn.
*Gee, E., Urbanna, Iowa.
Genung, A. G., Ithaca, N. Y.
*George, John, Buffalo, Mo.
George, R. H., Simpsonville, Ky.
*Gerald, G. B., Waco, Tex.
Gesner, Rev. A. H., Scarborough, N. Y.
*Getty, Daniel, White Bear Lake, Minn.
Ghere, A. B., Frankfort, Ind.
Gibbes, W. H., Columbia, S. C.
*Gibbons, Dr. C. H., Arbuckle, Cal.
Gibbs, E. P., Grand Haven, Mich.
Gibbs, Dr. Morris, Kalamazoo, Mich.
*Gibbs, William, Helena, Mont.
*Gibson, I. C., Bolinas, Cal.
*Gibson, James R., Saint James, Mich.
Gibson, William K., Jackson, Mich.
Giddens, M. C., Trenton, N. C.
*Giddings, George A., Wichita Falls, Tex.
*Gidley, R. L., Malvern, Iowa.
Gierschner, August, New Athens, Ill.
Gies, John J., Reese, Mich.
Gilbert, E. S., Canaseraga, N. Y.
Gilbert, H. Roy, Rochester, N. Y.
*Gilbert, J. B., Empire City, Oregon.
*Gilbert, T. J., Lenora, Kans.
Gilbreath, Charles L., Collinwood, Ohio.
Gilchriest, O. S., Macksburgh, Ohio.
*Gilchrist, L. W., Wahoo, Nebr.
*Gilclea, C. A., Brackettville, Tex.
Giles, F. W., Topeka, Kans.
Giles, Norwood, Wilmington, N. C.
*Gilleest, J. S., Garden Plain, Kans.
Gillespie, M. H., Aberdeen, Miss.
*Gillespie, W. A., jr., White Sulphur Springs, Ga.
*Gillette, R. B., Marionville, Mo.

*Gilliland, J. M , Nashua, Iowa.
*Gilman, William, Chamberlain, Dak.
Gilman, W. W., Stoughton, Wis.
Gilmore, D. S., Wilson's Mills, Ohio.
*Gilmore, Will A., Shoshone, Idaho.
Gilmore, William E., Chillicothe, Ohio.
*Gist, L. B., Beebe, Ark.
Gittings, M. R., Carrollton, Mo.
Gladwin, Francis, Akron, Ohio.
*Glazier, Henry E., Maysville, Mo.
*Gleason, C. R., Eau Claire, Wis.
Glennan, M., Norfolk, Va.
Glick, U. F., Newbern, Ind.
*Glover, A. D., Olympia, Wash.
*Glover, C. R., Long Pine, Nebr.
Glover, L. H., Cassopolis, Mich.
Goar, F. M., Tupelo, Miss.
Gochling, M. D., Shell Lake, Wis.
*Godbold, R. P., Summit, Miss.
*Godes, N., Preston, Iowa.
*Goff, J. B., Lincoln, Kans.
*Gooch, J. F., Moline, Kans.
Goodknight, T. M., Franklin, Ky.
Goodman, L. A., Westport, Mo.
*Goodner, G. D., Mount Ida, Ark.
Goodrich, H. O., Jerseyville, Ill.
Goodridge, John, Montrose, Va.
Goodwin, Ned W., Sharpsville, Pa,
*Googe, W. R., Douglas, Ga.
*Gordon, H. T., Morrilltown, Ark.
Gordon, Stephen P., Keeler's Bay, Vt.
Gordon, U. G., Barry, Ohio.
Gordon, William, New Castle, Pa.
Gorman, O. D., Talbotton, Ga.
*Goss, C. S., Palmer, Fla.
Goss, Col. N. S. Topeka, Kans.
*Gould, C. P., Estelline, Dak.
Gould, Daniel W., Moline, Ill.
Gowland, John, Philipsburgh, Pa.
Graham, Thomas P., Tazewell, Tenn.
Grant, D. D., Franklin, Pa.
*Grant, Jos. H., Bollinger's Mills, Miss.
*Graves, B. D., Bon Homme, Dak.
Graves, B. Y., Mount Airy, N. C.
Graves, Daniel, Provo City, Utah.
Graves, G. C., Carthage, N. C.
Graves, John, Wayland, Mich.
Graves, M., Lenawee Junction, Mich.
Gray, Andrew, Willoughby, Ohio.
Gray, Dr. Ormsby, Shelbyville, Ky.
Gray, Robert, Glasgow, Scotland.
Gray, S., Norwalk, Ohio.
Grayson, Albert L., Rutherfordton, N. C.
Green, Dr. C. A., Harrisburg, Pa.
*Green, D. L., English Lookout, La.
Green, Jas. B., Des Moines, Iowa.
*Green, J. B., Cambridge, Iowa.
Green, Morris M., Syracuse, N. Y.
Green, R. C., Bland C. H., Va.
Green, William W., Harrison, Mich.
Greenawalt, Davison, Chambersburgh, Pa.
*Greene, C. P., Northborough, Iowa.
Greene, Samuel B., Hare's Valley, Pa.
*Greeson, W. R., Clinton, Ark.
Gregory, Howell J., Lancaster Court House, S. C.
*Griffin, M., Springfield, Dak.
*Griffin, William T., Nashville, N. C.
*Griffith, D. G., Elkader, Iowa.
*Grinder, Nancy, Newburgh, Tenn.
Grinnell, F. W., Bay City, Mich.
*Grisell, A. H., Menlo, Iowa.
Grist, J. S., Tonganoxie, Kans.
Griswold, Dean F., Northville, Mich.
Griswold, H. C., Watkins, N. Y.
Groesbeak, William, Independence, Mo.
Groff, Dr. George G., Lewisburg, Pa.
Groninger, F. C., Camden, Ind.
*Groome, William, Vicksburg, Miss,
*Grow, A. L., Colfax, La.
Gruber, F., San Francisco, Cal.
*Guernsey, George F., Qu'Appelle, N. W. T., Canada.
*Guidry, P. L., Church Point, La.
*Guthrie, T. A., Strawn, Tex.
*Guthrie, W. L., Hamilton, Ill.
Gurney, J. H., jr., Northrepps, Norwich, England.
Gustin, Bert H., Bay City, Mich.
*Gwynn, D. W., Tallahassee, Fla.
Hadley, J. O., Grayling, Mich.
Hagen, Fannie, Cheviot, Ohio.
Hagen, Dr. H. A., Cambridge, Mass.
Hager, John G., Foxburgh, Pa.
*Hager, S. E., Salyersville, Ky.
Hagerty, Jas., Belle Vernon, Pa.
Hagerty, J. H., Ridgway, Pa.
*Haines, M. S., Erie, Colo.
Haines, S. R., Tamaroa, Ill.
*Haire, Daniel, Olivia, Minn.
Hairn, John T. M., Lexington, Ga.
Hale, Dayton, Columbus, Miss.
Hale, Samuel Q., Tuskegee, Ala.
Hale, W. P., Lufra, Ark.
*Haleman, George H., Farnsworth, Kans.
Hales, Henry, Ridgewood, N. J.
Haley, J. F., Jasper, Ala.
Hall, A., East Rockport, Ohio.
*Hall, E., Canyon City, Oregon.

*Hall, Henry R., Ash Grove, Mo.
Hall, Israel, Ann Arbor, Mich.
Hall, John A., Boone, Iowa.
Hall, R. N., Grenada, Miss.
Hall, S., Mount Carroll, Ill.
*Hall, Thomas, Preston, Minn.
Hall, W. B., Wakeman, Ohio.
Hall, W. M., Covington, Tenn.
Haller, Alex. S , Wytheville, Va.
Haller, R. J., Marion, Va.
Halley, James, Washington, D. C.
Halloman, W. D., Dawson, Ky.
Hallowell, Henry C., Sandy Spring, Md.
Halt, J. H., Knoxville, Ga.
Haltes, J. L., Napoleon, Ohio.
*Hamflet, F. M., Belen, Miss.
Hamill, P., Oakland, Md.
Hamilton, H. A., Emlenton, Pa.
*Hamilton, John H., Eureka Springs, Ark.
Hamilton, Dr. S. M., Monmouth, Ill.
Hammon, William A., Conneautville, Pa.
*Hammond, A. W., Durand, Wis.
Hampton, Will E., Harbor Springs, Mich.
Hancock, E. M., Waukon, Iowa.
Hancock, Frank B., Casky, Ky.
Hancock, Numa F., Wentworth, N. C.
*Hand, T. A., Charles City, Iowa.
*Hanes, J. B., Canton, Tex.
Haney, L., Sandy Hook, Ky.
Hanks, H. T., Ripley, Tenn.
Hannon, F. A., Clanton, Ala.
Hapgood, William, Warren, Ohio.
Harbron, George, Hamilton, Ohio.
Hardcastle, Charles, Marion, Kans.
Hardeman, Thomas, Macon, Ga.
*Harden, H. H., Abilene, Tex.
Hardy, Manly, Brewer, Me.
Hardy, Thomas. Adelaide, South Australia.
Hardy, W. V., Holman Station, Ind.
Harger, Ezra, Cadillac, Mich.
*Hargrave, Jesse, Laurel Hill, N. C.
Hargrue, C. S., Crawford, Ga.
Harkins, J. M., Calhoun, Ga.
Harkness, D. L., Berlin, Wis.
*Harlan, J. F., Pocahontas, Iowa.
*Harper, G. W., Bazile Mills, Nebr.
*Harris, D. W., Homer, La.
Harris, Henry, Union Springs, Ala.
Harris, H. G., Scottsville, Va.
*Harris, John S., La Crescent, Minn.
Harris, R. G., Alamo, Tenn.
Harris, S. S., Cape Girardeau, Mo.
Harris, Hon. W. A., Atlanta, Ga.
Harrison, Henry, Rochester, N. Y.
Harrison, James, Heathlands, Hampstead, England.
Harrison, John O., Franklin, N. C.
*Harrison, J. M., Friendship, Wis.
Harrison, Col. Randolph, Richmond, Va.
Harrold, W. H., Mount Gambier, South Australia.
Hart, A. W., Eureka, Kans.
Hart, John, jr., Livingston, Tenn.
Hart, S. L., Rocky Mount, N. C.
Harting, James Edmund, London, England.
*Harvard, Quinn L., Cochran, Ga.
*Harvey, Prof. F. L., Fayetteville, Ark.
Hasbrouck, Dr. Alfred. Poughkeepsie, N. Y.
Hasbrouck, Edwin M., Syracuse, N. Y.
Haskins, David E., Concord, Mich.
Haslet, Samuel H., Tionesta, Pa.
Hasson, James G., Ebensburgh, Pa.
*Hastings, Fred H., Roma, Tex.
*Hastings, Mrs. O. A., Port Gibson, Miss.
*Hatch, H. P., Whittemore, Iowa.
Hatch, Dr. P. L., Minneapolis, Minn.
*Hatch, S. W., Conejos, Colo.
Hatch, W. H., Rock Island, Ill.
Hatcher, F. C., Pikeville, Ky.
*Hatcher, R., Trader's Hill, Ga.
Hatcher, Thomas B., Grenola, Kans.
*Hatfield, D. D., Monarch, Colo.
*Hatfield, William H., Hollywood, Ga.
Hauly, Jas. H., Winfield, W. Va.
Haven, Martin, Albion, Mich.
*Haviland, Jas. S., Prescott, Wash.
Hawes, C. O., Luverne, Minn.
Hawley, A. H., Flushing, N. Y.
Hawley, J., England.
Haworth, George L., Pleasantville, Pa.
Haws, J. C., Jonesborough, Ga.
*Hayes, A. L., Cañon City, Colo.
Hayes, E. B., Watrousville, Mich.
*Haynes. H. C., Centerville, Iowa.
Haynes, J. M., Wilmington, Ohio.
Haynes, Thomas E., Franklin, Tenn.
*Haynie, C. R., Bastrop, Tex.
Hayworth, A. B., San Saba, Tex.
Hazard, R. G., 2d, Peace Dale, R. I.
Hazen, Allen, Hartford, Vt.
*Hazzard, P. A., Colorado, Tex.
*Heard, George, Rocky Ford, Ga.
*Hearn, Q. E., Marianna, Fla.
Heath, William McK., San Francisco, Cal.
*Hebert, O. P., Tallulah, La.
Heemey, E., Severance, Kans.
*Heffeman, John, Rives Junction, Mich.

Heffley, Charles W., Bennet, Nebr.
Hellier, Frank O., Grass Lake, Mich.
Helm, William, Madison, Wis.
Heltzel, William, Hanover, Pa.
Henderson, J. F., Aledo, Ill.
Henderson, Mary W., Oxford, Ga.
*Henderson, W. M., Cameron, Ga.
Hendricks, George R., Selin's Grove, Pa.
Hendrickson, W. F., Long Island City, N. Y.
*Hendryx, Charles F., Sauk Centre, Minn.
Henley, J. L., Tappahannock, Va.
Henman, David H., Willows, Dak.
*Hennessey, James, Carlisle, Ark.
*Hennessy, J. J., White Sulphur Springs, Mont.
Henning, George, Washington, D. C.
Henning, G. C., Louisville, Ky.
*Henry, Ira B., Mason, Tex.
Henry, J. K., Chester, S. C.
*Henry, S. P., Cameron, La.
Henry, T. J., East Genoa, N. Y.
Henshaw, H. W., Washington, D. C.
*Hensley, W. N., Columbus, Nebr.
Hepburn, A., England.
Herbert, D. O., Newberry C. H., S. C.
Herbert, H. S., Rolla, Mo.
Herrin, S. H., Cullman, Ala.
Hervey, William S., Carlyle, Ill.
*Herweg, Henry, Dakota, Nebr.
Hess, Benjamin F., Phœnix, N. Y.
Hewins, C. A., West Roxbury, Mass.
Hewitt, Henry J., Fairmont, Mo.
*Hewson, Stephen, Oxford, Minn.
*Hicks, A., Unionville, Iowa.
*Hicks, Jas. H., Wrightsville, Ga.
Hicks, John D., Old Westbury, N. Y.
Hicks, Percy, Port Washington, N. Y.
*Higby, E. P., Mapleton, Kans.
*Higgins, E. B., Hamline, Minn.
*Highsmith, J. N., Waynesville, Ga.
*Hightower, R. B., York Station, Ala.
Hill, A. F., Grayson, Ky.
*Hill, F. A., Weimar, Tex.
Hill, Herbert M., Watertown, N. Y.
Hill, Ivy, Pittsborough, N. C.
*Hill, John E., Manor, Tex.
Hill, John G., Hillsboro, Kans.
Hill, John H., Goldsborough, N. C.
Hill, Lewis H., Lockport, N. Y.
*Hill, R. W., Jewell, Kans.
Hill, Will. T., Indianapolis, Ind.
Hill, W. H., Manistique, Mich.
Hillman, Charles L., Chester County, Pa.
*Hills, J. M., Arcola, La.
Hills, Stephen, Windsor, Conn.
Hilton, Edgar, Blue Hill, Nebr.
Hilton, J. B., Plymouth, N. C.
*Himrod, G. S., Boisé City, Idaho.
Hinchman, Dalton, Vernon, Ind.
Hinds, Jas. M., Cookville, Tenn.
Hines, Florine A., Suffolk, Va.
*Hines, P. J., Green River City, Wyo.
Hinson, W. I., James Island, S. C.
Hirst, F., Echo City, Utah.
*Hitchcock, R. P., Tomah, Wis.
Hitchings, O. P., Winfield, N. Y.
*Hixson, Joseph, Mountain View, Ark.
Hoadley, Dr. F. H., New York, N. Y.
*Hobbs, George, Collins, Tex.
Hobbs, J., East Marden, South Australia.
Hodge, Eli, Columbia, Mo.
*Hodges, R. B., Manifest, La.
Hodgson, T. H., Berkeley Springs, W. Va.
*Hodkins, James, Appleton City, Mo.
Hodo, D. C., Carrollton, Ala.
Hoeft, Hermann, Rogers City, Mich.
Hoey, P., McDonald, Pa.
Hofer, A. F., McGregor, Iowa.
*Hoff, T. L., Gloster, Miss.
Holbrook, S. T., Norwich, Conn.
*Holcomb, Benton, West Granby, Conn.
Holder, F. T., Yonkers, N. Y.
Holder, Dr. J. B., New York, N. Y.
Holladay, Prof. A. Q., Lake City, Fla.
*Holland, R. A., Conwa, Iowa.
Hollick, Dr. F., New York, N. Y.
Hollis, George W., Brecksville, Ohio.
Hollis, George D , Summerville, Ga.
*Holman, D. S., Springfield, Mo.
Holman, J. H., Sciotoville, Ohio.
Holmead, William, Mount Pleasant.,D. C.
Holmes, Dwyer, Adelaide, South Australia.
Holmes, F. H., San José, Cal.
*Holmes, F. H., Wallisville, Tex.
Holmes, George B., Fernwood, Ill.
Holmes, J. T., Adelaide, South Australia.
Holmes R., Natchez, Miss.
Holmes, Mr., Magill, South Australia.
Holsinger, Prof. J. M., Winona, Minn.
Holt, John, South Jordan, Utah.
*Holterhoff, G., jr., San Diego, Cal.
Hooton, D. F., Bamberg, S. C.
Hopkins, C. L., Washington, D. C.
Hopkins, J., Glen Allen, Va.
*Hopkins, K. E., Livingston, Ala.
Hopkins, Stephen, Onancock, Va.
Hopkins, William C., Madison, W. Va.
*Hopper, W., Walnut, Iowa.

*Horan, T. B., Addison, W. Va.
Hornaday, Wm. T., Washington, D. C.
*Hornbach, R. W., Saint Ignace, Mich.
Horne, Laura E., Pittsborough, N. C.
*Horneck, S. N., Detroit City, Minn.
Horsford, F. H., Charlotte, Vt.
Hortan, Isaac, North East, Pa.
Hough, C. A., Hastings, Mich.
Houghton, John, Grinnell, Iowa.
Houssels, J. H., Linden, Tenn.
*How, Squire D., Marshall, Minn.
Howard, A. M., Powhatan C. H., Va.
*Howard, H. P., San Antonio, Tex.
*Howard, Mrs. Lella, Dunlap, Tenn.
Howard, L. O., Washington, D. C.
*Howard, O., Greeley, Colo.
Howard, W. W., Dixon, Mo.
*Howe, C. E., Greenleaf, Kans.
*Howell, A. J., Springer, N. Mex.
Howell, C. L., Grand Island, Nebr.
Howle, W. H., Edwardsville, Ala.
*Hoxie, Walter, Frogmore, S. C.
Hoy, F. D., Point Pleasant, W. Va.
Hoy, Dr. P. R., Racine, Wis.
*Hubbard, L. W., Monmouth, Iowa.
Hubbard, Melvin, Scottsburgh, Ind.
Hubbard, Seth R., Bay Shore, N. Y.
*Hubbard, W. H., Fairview, Dak.
Huber, John L., Tell City, Ind.
*Hubert, Hiram, Quitman, Ga.
Hudson, G. H., Plattsburgh, N. Y.
Hudson, Judge Wm. I., Hamilton, Ga.
*Hudspeth, B. F., Newton, Ga.
Hughes, B. B., Morganfield, Ky.
Hull, B. L., Chamois, Mo.
Hull, H. C., Meriden, Conn.
Hull, J. S., Raleigh C. H., W. Va.
Hull, Walter B., Milwaukee, Wis.
*Hulszir, E. O., Glendale, Mont.
*Humphrey, N. W., Taylor's Falls, Minn.
*Humphreys, Charles J., Argenta, Ark.
Humphreys, Jas. W., Braxton C. H., W. Va.
Hunley, R. R., Talladega, Ala.
*Hunt, A. M., Phillips, Wis.
Hunt, E. F., Richmond, Mich.
Hunt, John C., Lexington, N. C.
Hunter, C. E., Saegerstown, Pa.
Hunter, H. H., King George C. H., Va.
*Hunter, James, Alberton, P. E. I., Canada.
Hunter, Dr. M. A., Greenville County, S. C.
Huntley, H. S., Little Valley, N. Y.
Huntsman, A. F., Lonoke, Ark.
*Hurlburt, F. T., Arlington, Oregon.
Hurlbut, W. D., Rochester, Minn.
Hurst, N. B., Dover, Ohio.
Hurt, William B., Chatham, Va.
Huston, Thaddeus, Salem, Ind.
Hutcheson, Jas. M., Young Hickory, Ohio.
Hvoslef, Dr. J. C., Lanesboro, Minn.
Hyde, Jas. F. C., Newton Highlands, Mass.
Ihle, C., Pomeroy, Ohio.
Iliff, Joseph, Vinland, Kans.
Ind, G. F., Adelaide, South Australia.
Ingalls, Charles E., East Templeton, Mass.
Ingersoll, Ernest, New Haven, Conn.
Ingersoll, Seymour R., Cleveland, Ohio.
Ingersoll, T. Dwight, Erie, Pa.
Ingram, W., Odin, Ill.
Inman, John, Somerset, Ky.
*Ioor, Ella E., Bay Saint Louis, Miss.
Irion, Dr. John T., Paris, Tenn.
Irwin, Bell, Bad Axe, Mich.
*Irwin, David O., Lake City, Minn.
Irwin, John W., Goshen, Ind.
*Irwin, W. D., Palouse, Wash.
Irwin, W. N., South Salem, Ohio.
*Isensee, P. M., Whatcom, Wash.
*Ivey, William T., Pomeroy, Iowa.
Ivory, Theo. W., Glenwood, Iowa.
Jackson, Eugene A., Atlanticville, N. Y.
Jackson, Martin, New Bedford, Pa.
Jackson, O. F., Ithaca, Mich.
Jackson, R. M., London, Ky.
Jackson, S. D., Mountain City, Tenn.
*Jacobs, C. M., Rosewood, Fla.
Jacobs, Francis, West Chester, Pa.
Jacobson, H., Redwood City, Cal.
Jagersfeld, Carl von, Washington, Ark.
*James, J. R., Columbia, Dak.
James, S. R., Marden, South Australia.
Jameson, Martin A., Lebanon, Ohio.
Jamison, L. M., Wapello, Iowa.
Jaques, J. H., Allerton, Iowa.
Jeffrey, Jas. R., Elmdale, Kans.
*Jeffries, S. D., Clark, Dak.
*Jellison, Thos. J., Amity, Oregon.
*Jenal, J. P., Hartington, Nebr.
Jencks, Fred. T., Hills Grove, R. I.
Jenkins, G. W., Crandall, Ind.
*Jenkins, R. E., Port Royal, S. C.
Jenner, A. E., Belvidere, Ill.
Jennings, Dr. Geo. H., Jewett City, Conn.
Jennings, H. M., Rochester, N. Y.
Jennings, Jas. S., Waynesburgh, Pa.
Jenson, Jas., Draper, Utah.
*Jermy, Gustav, San Antonio, Tex.

*Jerome, F. E., Russell, Kans.
Jervois, Sir William Francis Drummond, South Australia.
Jervy, Theo. D., Charleston, S. C.
*Jessup, T. H., Waitsburgh, Wash.
Jillson, S., Tuckerton, N. J.
Johns, William, St. Mary Church, Devonshire, England.
*Johnson, A. F., Liberty, Kans.
Johnson, A. I., Hydeville, Vt.
*Johnson, A. J., Farrsville, Tex.
*Johnson, B. F., Mount Pleasant, Tex.
*Johnson, Charles, Carver, Minn.
*Johnson, Charles A., Saint Peter, Minn.
Johnson, C. P., Clinton, N. C.
Johnson, C. S., Carthage, Ohio.
*Johnson, Dr. F. W., Fort Smith, Ark.
*Johnson, George, H. F., Kelso, Dak.
Johnson, Henry M., Sharpsburgh, Md.
*Johnson, H. A. Dalhousie, N. B., Canada.
Johnson, Jas., Springfield, Ohio.
Johnson, James I., Marissa, Ill.
Johnson, Jas. J., Johnsonville, Ill.
Johnson, James L., Hartwell, Ga.
Johnson, John H., Netawaka, Kans.
*Johnson, J. Frank, Peeryville, W. Va.
*Johnson, J. H. Meridian, Tex.
Johnson, J. N., Savannah, Ga.
Johnson, J. R., Hardinsburgh, Ky.
Johnson, J. T. Milnersville, Ohio.
Johnson, J. W., Meriwether, S. C.
*Johnson, Marcus, Atwater, Minn.
Johnson, M. B., Clarksville, Tenn.
*Johnson, Prof. O. B., Seattle, Wash.
Johnson, Robert, Manistee, Mich.
Johnson, Hon. Sylvester, Irvington, Ind.
Johnson, William W., Glenville, W. Va.
Johnson, W. B. K., Allentown, Pa.
Johnson, W. D. H., Pope's Ferry, Ga.
Johnston, D. C., Fulton, Kans.
Jones, A. S., Bainbridge, Ohio.
Jones, D. C., Harrison, Ohio.
*Jones, Edward M., Walterborough, S. C.
*Jones, Evan G., Cherry Creek, Idaho.
*Jones, E. B., Stephenville, Tex.
Jones, George C., Brookfield Centre, Conn.
Jones, Dr. Howard, Circleville, Ohio.
*Jones, H. T., Green Castle, Mo.
Jones, John R., Chatfield, Minn.
*Jones, Jos. B., Herndon, Ga.
*Jones, J. J., Le Beau, Dak.
Jones, J. Matthew, Halifax, N. S., Canada.
Jones, Lynds, Grinnell, Iowa.
*Jones, R. G., Dawson, Ga.
*Jones, R. H., Saguache, Colo.
*Jones, William J., Brandon, Dak.
Jones, W. F., Lexington, Tenn.
Jordan, D. A., Jackson, N. C.
Jordan, H. A., Manchester, Va.
Jordan, W. W., Harmony Grove, Ga.
Judd, J. M., Emporium, Pa.
*Judson, Hamilton H., Farmington, Minn.
Kaehler, Conrad E., Louisville, Ill.
Kalk, C. F., Cumberland, Wis.
Karn, William C., Burkittsville, Md.
*Karr, John, Little Rock, Ark.
Kaucher, William, Oregon, Mo.
Kear, R. W., Pottsville, Pa.
Keays, H., Hyde Park, London, Ontario, Canada.
*Keck, H. A., Cotulla, Tex.
Keck, J. M., Mentor, Ohio.
Keeler, Charles, Milwaukee, Wis.
Keeney, W. H., Fox Lake, Wis.
*Keerl, H., Mason City, Iowa.
Keim, Edward T., Dubuque, Iowa.
Keister, A. T., Blacksburgh, Va.
Keiter, Josiah, New Winchester, Ohio.
Keith, L. C., Norfolk, Mass.
*Keith, P. W., Strawberry Point, Iowa.
Kell, James, York, Pa.
*Kellogg, C. S., McComb, Miss.
Kellogg, H. C., Canton, Ga.
Kells, Wm. L., Listowel, Ontario, Canada.
Kelly, Henry, Adelaide, South Australia.
Kelly, J. F., Coffeeville, Miss.
*Kelly, M. W., Lake Crystal, Minn.
Kelsall, George, Saint Mary's, W. Va.
Kelsey, Carl, Grinnell, Iowa.
Kelsey, Eugene, Dickson, Tenn.
Kemp, S. W., Kempton, Ohio.
*Kempe, E. L., Montevideo, Minn.
*Kemper, Henry, Perham, Minn.
*Kempker, John, jr., West Point, Iowa.
Kendall, William M., West Liberty, Ky.
*Kennard, Samuel J., Waldo, Fla.
Kennedy, R., McMinnville, Tenn.
Kennedy, Thomas S., Crescent Hill, Ky.
Kenney, Jas. G., Provo City, Utah.
*Kenyon, O. A., McGregor, Iowa.
Kenyon, W. J., Brooklyn, N. Y.
*Keoke, R. F., West Point, Nebr.
*Kephart, W. H., Miller, Dak.
*Kerwin, Jas. H., Glenwood Springs, Colo.
*Kessler, Charles A., Schulenburgh, Tex.
*Ketch, M. S., Alamota, Kans.
Keyes, C. R., Des Moines, Iowa.
*Keyes, John B., Friendship, Wis.
Keys, J. M., Richland Centre, Wis.

*Kiblinger, Lee, Jackson, La.
Kidder, Dr. J. H., Wood's Holl, Mass.
*Kiehle, D. L., Saint Paul, Minn.
Kightly, Charles, Poseyville, Ind.
*Kilgore, Fidelia, Longview, Tex.
Killen, T. M., Perry, Ga.
Killian, T., Escanaba, Mich.
*Kilpatrick, J. R., Flagstaff, Ariz.
Kimball, Dr. F. H., Rockford, Ill.
Kimball, S. T., Ellington, Conn.
*Kinalski, Benjamin, Brownsville, Tex.
Kincaid, R. S., Clinton, Tenn.
Kinchelve, Jas. M., Upperville, Va.
*King, Charles L., Millbank, Dak.
King, Dr. E. H., West Liberty, Iowa.
*King, E. P., Hawkinsville, Ga.
King, Prof. F. H., River Falls, Wis.
King, H. C , Oscoda, Mich.
King, J. M., Knoxville, Tenn.
*King, J. W., Murphy, N. C.
King, Otis G., Kenosha, Wis.
King, Richard, Brooklyn, Conn.
King, S. L., Bristol, Tenn.
Kingsbury, Ethie Coe, Willow, Ohio.
Kingsbury, Howard, Burlington, Iowa.
*Kingsbury, H. H., Spencer, Mass.
Kingsbury, J. G., Indianapolis, Ind.
*Kingsbury, W. J., Linwood, Nebr.
*Kingston, W. P., Warner, Dak.
*Kinkler, August, Cat Spring, Tex.
*Kinsey, B. L., Harlan, Iowa.
*Kinthof, H., Dover, Ark.
*Kirby, James H., Allapaha, Ga.
Kirkley, D. C., Camden, S. C.
Kirkman, T. J., Santaquin, Utah.
*Kitch, J. S., Lynnville, Iowa.
*Kittle, John S., Seward, Nebr.
*Kleven, B., Culbertson, Nebr.
Knapp, G. W., Leon, W. Va.
Knaus, Warren, McPherson, Kans.
Knight, E. L., Newport, Pa.
*Knight, H. M., Carthage, Tex.
*Knight, J. L. H., Lee Park, Nebr.
*Knight, Miletus, Durand, Wis.
Knox, John, Taylorstown, Pa.
Koch, H. A., College Hill, Ohio.
Koch, John, Alton Junction, Ill.
Koerner, Herman, Birdseye, Ind.
Koffman, J. H., Humboldt, Tenn.
Konkle, Kate, Caledonia Station, Mich.
*Konz, John A., Marienfeld, Tex.
Koons, Prof. B. F., Mansfield, Conn.
*Kornce, W. C., Columbia, Ala.
*Krasinsky, Theo. J., Garnaville, Iowa.
Krider, Brittell, Madison C. H., Va.
Krom, S. A., Plainfield, N. J.
*Krueger, William, Ossco, Minn.
Kruskopf, Max, Marshalltown, Iowa.
*Kuhl, J. H., Earling, Iowa.
Kuoni, C., Sauk City, Wis.
Kupp, John, Bangor, Wis.
Kuster, J. D., Nebraska, Ind.
*Kyle, Jas., Hyde Park, Dak.
*Labodie, T., Las Vegas, N. Mex.
Lacey, Samuel S., Marshall, Mich.
Laffer, H. Adelaide, South Australia.
*Laing, James, Persia, Iowa.
Laird, Francis, Saltsburgh, Pa.
Laird, Mrs. Mary G., Scranton, Miss.
*Lakes, Arthur, Golden, Colo.
Lamar, Robert, Boonsborough, Md.
Lamb, J. C., Williams, Ind.
Lamb, William F., Holyoke, Mass.
Lambie, William, Ypsilanti, Mich.
Lambright, Lewis, Middletown, Ohio.
Lamkin, George, Norwalk, Ohio.
*Lamkin, J. S., Booneville, Ark.
Landers, E. J., Imlay City, Mich.
Landis, H. K., Landis Valley, Pa.
Landolt, Ulrich, Port Washington, Wis.
*Lane, A. V., Austin, Tex.
Lane, T. J., Greeneville, Tenn.
Langdon, Dr. F. W., Cincinnati, Ohio.
*Langford, S. W., Rolling Fork, Miss.
*Langlie, H. A., Portland, Dak.
Lanier, John R., Williamston, N. C.
Lankford, B. C., Brevard, N. C.
Lankheet, Hein, Allegan, Mich.
Lanning, W. J., Corunna, Ind.
Lantz, Prof. D. E., Manhattan, Kans.
Lantz, George, McArthur, Ohio.
Larkin, J. B., Pittsburgh, Pa.
*Larsen, Charles O., Sturgeon Bay, Wis.
Larsen, Fred., Mendon, Utah.
*Larsen, James, Nephi, Utah.
Latham, George, Fairburn, Ga.
Latimer, A. W., Lumpkin, Ga.
Latimer, J. B., Lumpkin, Ga.
*Laubersheimer, A., Wilmington, Cal.
Lauffer, S. D., Irwin, Pa.
*Laury, C. S. M., Sheldon, Iowa.
Lausen, Jas. D., Woodstown, N. J.
Lavies, William, Santa Barbara, Cal.
Law, B. C., Darlington C. H., S. C.
*Lawless, A. W., New Berlin, Fla.
Lawrence, G. W., Fayetteville, N. C.
Lawton, Charles H., Newport, R. I.
*Lay, H. C., Telluride, Colo.
Lear, I. D., Salem, Ill.
*Lee, Alfred C., Oriska, Dak.

Lee, C. C., Shepherdsville, Ky.
*Lee, Reuben B. Carl, Devall's Bluff, Ark.
Lee, W. J., Nashville, Ark.
Leeds, Edward W., Union Bridge, Md.
Lees, F. A., England.
*Leftwich, D. C., Port Vincent, La.
Leinart, A. L., Maynardville, Tenn.
*Leonard, I. E., Socorro, N. Mex.
Leonardson, John, New Haven, Mich.
Leonardson, John B., Mount Clemens, Mich.
Leue, Adolph, Cincinnati, Ohio.
Levy, James M., Covington, Ga.
*Levy, M. C., Lake Butler, Fla.
*Lewellyn, Rees R., Fountain Green, Utah.
Lewis, A. A., Gallatin, Tenn.
Lewis, John B., Eubank, Ky.
Lewis, M. D. L., Jackson C. H., W. Va.
*Lewis, S. E., Fort Gaines, Ga.
*Lewis, S. G., Grass Valley, Cal.
Lewis, William H., Pawtucket, R. I.
Lewis, W. S., Statesville, N. C.
*Lieb, H. A., Alton, Iowa.
Lightner, John S., Randolph, Wis.
Lilford, Lord, London, Eng.
Lincoln, L. A., Mazo Manie, Wis.
Lind, William, Hillsborough, Wis.
Linden, Prof. Charles, Buffalo, N. Y.
Linderman, A. K., Troy, Pa.
Lindly, B. F., Oskaloosa, Iowa.
Lindsay, A. H., Portsmouth, Va.
Lindsay, J. H., Kernersville, N. C.
*Lindsey, W. M., Elmo, Tex.
Lingafelt, James M., Hollidaysburgh, Pa.
Linn, Robert, North Linndale, Ohio.
Lintner, Prof. J. A., Albany, N. Y.
Linton, Nathan M., Wilmington, Ohio.
Linville, John C., Gap, Pa.
*Litson, W. H., jr., Benton, Kans.
Little, Frank, Kalamazoo, Mich.
Livingston, Clara K., Seneca, S. C.
Livingston, Jennie R., South Pittsburgh, Tenn.
*Lloyd, William, Paint Rock, Tex.
Lock, Thomas W., Louisiana, Mo.
Lockhart, W. W., Lake George, N. Y.
*Loforge, Charles A., New Madrid County, Mo.
Logan, W. F., Williamsport, Pa.
Logue, John C., Central City, Nebr.
Lomax, W. P., San Francisco, Cal.
*Long, C. W., Andrew, Iowa.
*Long, Dr. F. A., Madison, Nebr.
*Long, J. M., Primghar, Iowa.
Long, M. H. L., Charlottesville, Va.
*Long, R. B., Tyler, Tex.
Longyear, William D., Mason, Mich.
Loomis, P. B., Jackson, Mich.
*Looney, James B., Hancock, Mich.
Loor, W. C., Greensburgh, Pa.
Lord, M. S., Saranac, Mich.
Lorquin, E. F., San Francisco, Cal.
*Lothrop, John, Dayton, Nev.
*Love, George T., Huron, Dak.
*Love, John D., Macksburgh, Iowa.
*Love, M. E., Carrollton, Miss.
Loveland, Elmer, Call's Fort, Utah.
Lovett, J. W., Brandon, Vt.
Lowden, A. D., Noble, Ohio.
Lowe, R., England.
Lowell, George P., San Francisco, Cal.
Lowry, J. N., Greenville, Ohio.
*Lucas, C. H., Mound, La.
Lucas, Frederic A., Washington, D. C.
Lugger, Otto, Baltimore, Md.
Luikart, J. J., Nottingham, Ohio.
Lumpkin, Thomas B., Buena Vista, Ga.
Lyford, George A., Rouseville, Pa.
Lyon, W. D., Elkhorn, Wis.
*Lyons, John D., Benson, Minn.
*Lytle, Samuel, Castroville, Tex.
McAdams, Hon. Wm., Alton, Ill.
McAdoo, R. J., Waverly, Tenn.
McArthur, A., Winnipeg, Manitoba, Canada.
McArthur, E. W., Meadville, Pa.
*McAuley, Robt., Atlantic City, Wyo.
*McAusland, John, Miles City, Mont.
*McBride, A., Winnsborough, Tex.
*McBride, W. D., Boonsborough, Ark.
McBrown, Wm., Fall River, Kans.
*McCabe, C. A., Pomeroy, Wash.
McCabe, Jas. W., Chilton, Wis.
McCaleb, John D., Mount Pleasant, Pa.
*McCall, H. J., Madison, Fla.
McCallum, Dr. G. A., Dunnville, Ontario, Canada.
McCampbell, W. C., Union City, Tenn.
McCartney, J. S., Garnett, Kans.
McCarty, Wm. G., Jefferson City, Mo.
*McCauley, James, White Lake, Dak.
*McCauley, John C., Searcy, Ark.
*McClain, J. M., Catlin, Colo.
McClellan, J. H., Oakland City, Ind.
McClure, James O., Warsaw, N. Y.
McCollough, T. J., Alpine City, Utah.
*McCook, Jas. M. H., Robeline, La.
McCormick, W. A., Morning Sun, Iowa.
McCoy, Frank D., Sistersville, W. Va.
McCrassen, W. M., West Branch, Mich.

McCrea, Dr. A. B., Berwick, Penn.
*McCreless, Wm. A., Albertville, Ala.
*McCulloh, R. L., Fort Assinaboine, Mont.
McCune, J. A. C., Shippensburgh, Pa.
*McDaniel, Jerry, Centreville, Tex.
*McDaniel, W. B., Faceville, Ga.
McDannold, John J., Mount Sterling, Ill.
McDearman, T. R., Danville, Va.
*McDonald, A., Glenmary, Tenn.
*McDonnell, M. W., Alma, Wis.
McDougall, R. A , North Branch, Mich.
McElrath, J. J. B., Centre, Ala.
McFall, Gid. B., Oskaloosa, Iowa.
McFall, S., Fredonia, Ind.
McFerran, S. S., Beaver Falls, Pa.
McGee, Jas. S., Paris, Mo.
*McGehee, I. M., Milton, Fla.
*McGinnis, W. T., Minden, Nebr.
McGlashan, P. J., Morantown, Kans.
*McGoldrick, J. R., Coushatta, La.
McGraw, H. H., Whitewater, Wis.
*McGregor, R., River Falls, Wis.
*McGuin, T. R., Rosedale, Miss.
McHenry, Estill, Saint Louis, Mo.
McHugh, T. J., Calvert, Tex.
McIlwraith, Thomas, Hamilton, Ontario, Canada.
McIlyas, W. H. H., Cambridge, Ohio.
*McInness, W. F., Monticello, Miss.
*McIntire, A. P., Warren, Minn.
*McIntire, S. B., Houston, Minn.
*McKee, R. J., Jasper, Fla.
*McKeon, P., Rush City, Minn.
*McKernan, John Q., L'Anse, Mich.
McKinney, J. B., Newburgh, Ind.
*McKnight, J. H., Fort Shaw, Mont.
McLachlan, Wm. M., Clyde, N. Y.
McLaughlin, D., Waseca, Minn.
McLaurine, H. Clay, Pulaski, Tenn.
McLean, A., Augusta, Ohio.
McLean, S. M., Canal Dover, Ohio.
McLellan, Charles, Trenton, Ontario, Canada.
*McLeod, Daniel, Leaksville, Miss.
McLeod, E. A., Palmyra, Mo.
*McMannen, Dr. C. T., Houston, Fla.
*McMillan, James J., Caldwell, Tex.
McNair, S. N., Emmitsburgh, Md.
McNally, S. J., Harrisville, Mich.
*McNamara, Geo. G., Port Townsend, Wash.
McNichol, Harry E., North East, Pa.
McNutt, W. H., Kingston, Tenn.
*McPheely, J. L., Minden, Nebr.
*McPherson, C. L., Holly, Colo.
McPherson, John W., Hopkinsville, Ky.
*McPherson, L. S., Sherman, Tex.
*McPherson, Thos. B., Arapahoe, Nebr.
McQuesten, Dr. C. B., Dobbs Ferry, N.Y.
*McReynolds, G. W., Nepesta, Colo.
McShene, M., Campbelltown, S. Australia.
*McSparran, J. S., Sloan, Iowa.
McWhirter, A. J., Nashville, Tenn.
*Mabbett, Gideon, Rodney, Miss.
Macbeth, Alex., Georgetown, S. C.
Mack, John T., Sandusky, Ohio.
*Mac Kay, Prof. A. H., Pictou, N. S., Canada.
Mackay, Rev. Henry, Emporia, Kans.
Macon, R. C., Orange C. H ,Va.
Madison, Wm. H., East Enterprise, Ind.
Magill, C. M., Volcano, W. Va.
Magruder, H. E , Keswick Depot, Va.
*Maguire, John, Republic, Mich.
Mahon, Charles, Dunkirk, Ohio.
*Malleis, Wm. B., Cedar Mill, Oregon.
*Mallett, W. R., Chapel Hill, N. C.
Mallory, B. H., Clarington, Ohio.
Maloney, T. S., Quinnimont, W. Va.
Mangum, Dr. W. L., Cullman, Ala.
Manigault, Dr. G. E., Charleston, S. C.
*Manix, P. A., Augusta, Mont.
Manly, M., New Berne, N. C.
*Mann, Julia A., Mann's Harbor, N. C.
Manning, Thomas, New York, N. Y.
Marckres, George M., Sharon, Conn.
Margraves, G. W., Sneedville, Tenn.
Marker, C. F., Ligonier, Pa.
Markham, W. G., Rochester, N. Y.
Marriott, George, Sandy, Utah.
Marrs, Jas. R., Danville, Ky.
Mars, Willis, Denver, Mo.
*Marsh, A. S., Red Cloud, Nebr.
*Marshall, Carl C., Arcata, Cal.
*Marshall, J. A., Kaufman, Tex.
Marshall, R. E., Booneville, Miss.
*Marshall, William, Castlewood, Dak.
Martin, C. R., Stuart, Va.
*Martin, B. S., Terrell, Tex.
Martin, E. S., Mechanicstown, Ohio.
Martin, George W., Chattanooga, Tenn.
Martin, Dr. G. A., China, Me.
Martin, G. W., Charleston, Mo.
Martin, N. A., Danbury, N. C.
Martin, T. J., Waynesborough, Va.
Martin, W. P., Cottonwood Falls, Kans.
Mason, E. E., Accotink, Va.
Mason, G. D., Corunna, Mich.
Mason, Henry H., Farmington, Conn.
Mason, H. H., Niles, Ohio.

Mason, Orville F., Stanton, Mich.
Mason, Prof. Otis T., Washington, D. C.
Mason, T. A. H., Sackville, N. B., Canada.
Mason, W. T., Pungoteague, Va.
Mathers, Dr. J. R., Buckhannon, W. Va.
*Mathys, George, Arcadia, Wis.
Matson, Jas. B., North Bend, Ohio.
*Matteson, F. S., Aumsville, Oregon.
Matthews, Robert J., Baldwin, Mich.
*Matthews, Thomas M., Athens, Tex.
Mattoch, C. P., Portland, Me.
*Maughs, L. L., Denison, Tex.
Mauney, W. A., King's Mountain, N. C.
*Maurer, William, Maiden, Mont.
*Mawherter, D., Tin Cup, Colo.
Maxson, B. F., Westerly, R. I.
Mayberry, J., Burlingame, Kans.
Mayer, Dr. I. H., Willow Street, Pa.
Maynard, C. J., Boston, Mass.
Mayo, A. C., Ashland, Va.
*Mayo, H. M., Morgan City, La.
*Mazyck, W. St. I., Waverley Mills, S. C.
Mead, E. C., Keswick Depot, Va.
*Meadows, F. C., Caddo, C. N., Ind. T.
Mearns, Dr. Edg. A., Highland Falls, N. Y.
Meehan, Thos., Germantown, Pa.
Meigs, General, M. C., Washington, D. C.
Meily, R. W., Lima, Ohio.
*Meirscheidt, Arthur, La Grange, Tex.
Melzer, Jas. P., Milford, N. H.
Menard, Augustine, Ste. Genevieve, Mo.
*Menefee, C. A., Los Gatos, Cal.
*Menefee, R. P., Bozeman, Mont.
Menville, Dr. Charles, Napoleonville, La.
*Merchant, I. T., Broken Bow, Nebr.
Merony, Callie, Carthage, Tenn.
Merrell, E. A., Carrollton, Ga.
Merriam, Dr. C. Hart, Washington, D. C.
*Merrick, P. D., Villisca, Iowa.
Merritt, W. H., Des Moines, Iowa.
*Merry, W. Y., Mandarin, Fla.
Metcalf, F. H., Holyoke, Mass.
Metsker, Chas., Yeoman, Ind.
Metz, Manoah, Smithsburgh, Md.
Micklem, H. Martyn, Variety Mills, Va.
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Mikesell, Thos., Wauseon, Ohio.
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Schumacher, Ferdinand, Akron, Ohio.
*Schweiger, Thomas, Glenwood, Minn.
*Scofield, L., Westside, Iowa.
Scot-Skirving, R., Edinburgh, Scotland.
Scott, Jas. N., Malden, W. Va.
Scott, J. G., Westfield, Mass.
*Scott, Kennedy, Rio, Wis.
*Scott, O. L., Silver City, N. Mex.
Scott, S. H., Chanute, Kans.
Scott, Dr. S. M., Terra Alta, W. Va.
*Scott, W. F., Mapleton, Iowa.
Scott, W. L., Ottawa, Ontario, Canada.
Scott, W. T., Murray, Ky.
Scruggs, A. T., Iuka, Miss.
*Seages, J. H., Gilman, Iowa.
*Seaman, J. W., Loveland, Colo.
Seaver, F. W., Aaron, Ind.
*Seavey, Stanton D., Mora, Minn.
Seeland, N. P., Gaines Station, Mich.
*Selby, John W., El Dorado Springs, Mo.
Seliger, Mrs. W., Hartford, Conn.
*Seligman, A., Santa Fé, N. Mex.
*Selover, George H., Lake City, Minn.
*Selvig, O., Willmar, Minn.
Setzer, F. M., Albany, Mo.
*Sewall, J. A., Boulder, Colo.
Sewell, T. M., New Athens, Ohio.
*Seymour, F. A., Monroeville, Ala.
*Shackleford, F. A., Warsaw, Va.
Shade, J. S., McConnellsburgh, Pa.
Shafer, L. W., Glen Rock, Pa.
Shale, J. B., McKeesport, Pa.
*Shailenberger, A. C., Osceola, Nebr.
*Shallenberger, Eugene, Bradshaw, Nebr.
*Shambaugh, J. H., La Grande, Oregon.
Shank, J. H., Hickory, W. Va.
*Shannon, Elmer S., Bayard, Iowa.
*Shannon, F. P., Carbon, Wyo.
Shannon, H. C., Erie, Pa.
Sharp, A. H., Nashville, Tenn.
Sharp, Dr. A. P., Baltimore, Md.
Sharp, F. C., Oconto, Wis.
Sharp, Kate Dooris, London, Ohio.
*Sharp, W. T., Brooklyn, Iowa.
Sharpless, Philip, West Chester, Pa.
Shatto, Jos. M., Duncannon, Pa.
*Shaver, R. B., Menlo, Iowa.
Shaw, Andrew, Huron, Mich.
Shaw, Charles H., West Berlin, Ohio.
*Shaw, C. G., Vermillion, Dak.

*Shaw, I. Wilson, Milledgeville, Pa.
Shaw, Wm. S., Sault de Ste. Marie, Mich.
*Shawhan, W. T., Carleton, Nebr.
*Shayer, G. G., Cañon City, Colo.
Sheild, F. M., Yorktown, Va.
Sheldon, A. C., New Haven, Conn.
Shell, W. M., jr., Elizabethtown, Tenn.
Shelley, George M., Kansas City, Mo.
*Shelsten, I., Farmersville, La.
*Shelton, W. H., Malden, Mo.
Shely, De Witt C., Nicholasville, Ky.
Shepherd, J. N., Berryville, Va.
Shepley, Henry, Nevada, Mo.
*Sherman, Dan. J., Ashtabula, Ohio.
*Sherwood, Andrew T., Bismarck, Dak.
*Shiekley, V. C., Geneva, Nebr.
Shields, S. W., Morristown, Tenn.
*Shields, William, Austin, Mo.
*Shier, John, Pioche, Nev.
Shimer, Dr. Henry, Mount Carroll, Ill.
Shircliff, C. H., Solon, Iowa.
Shirley, M. A., Logan, Utah.
*Shoemaker, A. H., Decatur, Tex.
Shoemaker, Thomas H., Philadelphia, Pa.
Shoffner, M. M., Company's Shops, N. C.
Short, C. W., Greenville, Ky.
*Short, W. G., Potterville, Kans.
Showalter, John A., Latrobe, Pa.
*Showell, M. F., Kimberly, Minn.
Shower, Adam, Manchester, Md.
Shroyer, Thomas, Preston, Ohio.
*Shrum, W. F., Gilmer, Tex.
Shryock, Thomas W., Louisville, Nebr.
*Shufeldt, Dr. R. W., Cheyenne, Wyo.
Shuford, Fannie, Oxford, Ala.
Shurter, Jos. W., Gansevoort, N. Y.
Shutz, Jas., Romney, W. Va.
Sibbald, George, Aberdeen, Ohio.
Sieg, W. H. H., Steelton, Pa.
*Sigler, John A., Harold, Dak.
Silcott, U. A., Youngsville, Ohio.
*Simms, Rufus B., Blountsville, Ala.
Simmons, C. C., Chariton, Iowa.
*Simmons, M. D., Harrisburgh, Ark.
Simon, J. H., Hartford, Wis.
*Simonds, S. C., Hudson, Wis.
Simpson, E. W., Ripley, Miss.
Simpson, J. T., Loudon, Tenn.
Simpson, Robert, Wheeling, W. Va.
*Singleton, B. D., College Mound, Mo.
*Sisson, Nathaniel, Wray, Colo.
Skavlem, H. L., Janesville, Wis.
*Skeen, R. J., Nemaha City, Nebr.
Skinner, F. G., Hamilton County, Ohio.
Slade, Elisha, Somerset, Mass.
Slater, H. H., England.
Slater, H. N., England.
Sledge, W. T., Lawrenceville, Va.
*Sloan, C. G., Heppner, Oregon.
Slocumb, D. M., Hernando, Miss.
Slyer, J. P., Moorefield, W. Va.
Small, H. B., Ottawa, Ontario, Canada.
Smead, S. M., Fond du Lac, Wis.
*Smethers, W. R., Starkville, Colo.
Smeych, Daniel, Lancaster, Pa.
*Smiley, A. R., Skowhegan, Me.
Smith, A. E., Guyandotte, W. Va.
Smith, A. J., Amherst, Wis.
Smith, A. J., Garrettsville, Ohio.
Smith, B. B., Chillicothe, Mo.
Smith, B. F., Lawrence, Kans.
Smith, Everett, Portland, Me.
Smith, E. C., Ravenswood, W. Va.
*Smith, E. R., Le Sueur, Minn.
Smith, Dr. F. S., West Hartford, Conn.
*Smith, F. C., Kellerton, Iowa.
Smith, F. S., Saginaw, Mich.
Smith, G., Cadiz, Ky.
Smith, G. A. B., Wetumpka, Ala.
Smith, Henry A., Spencer, W. Va.
Smith, Henry E., Brownsville, Ky.
Smith, Herbert C., West Union, Ohio.
*Smith, H. G., jr., Denver, Colo.
*Smith, James D., Dallas, Oregon.
Smith, Jesse F., Suffield, Conn.
*Smith, Dr. Joel W., Charles City, Iowa.
*Smith, John J., Oroville, Cal.
Smith, J. B., Fayetteville, N. C.
Smith, L. E., Middlebourne, W. Va.
Smith, L. H., Strathroy, Ontario, Canada.
Smith, L. R., New Cumberland, W. Va.
*Smith, N. A., Neilly, Ga.
Smith, O. C., North Adams, Mich.
*Smith, P. A., Navasota, Tex.
*Smith, Dr. Q. C., Austin, Tex.
*Smith, R. H., Edwards, Miss.
*Smith, Sherod, Homerville, Ga.
*Smith, S. E., Witcherville, Ark.
*Smith, Tenny, Grand Junction, Iowa.
*Smith, Wash. E., Purdy, Mo.
*Smith, William J., Eureka, Nev.
Smith, William R., Washington, D. C.
*Smith, W. Egbert, Butte City, Mont.
Smither, Herbert L., Saluda, Va.
Snead, N. C., Gaffney, S. C.
*Snell, C. W., Oconee, Ga.
*Snoddy, John, Big Spring, Tex.
Snodgrass, A., Scottsborough, Ala.
Snow, B., Kalamazoo, Mich.
Snow, Edward, Boonville, N. Y.

Snow, G. C., Penn Yan, N. Y.
Snow, H. M., Central, Mo.
*Snyder, A. C., Cheyenne City, Wyo.
Snyder, Charles W., Hudson, N. Y.
Snyder, Clarence, Racine, Wis.
Snyder, Harrison, Rockwood, Pa.
Snyder, H., Fairfield, Utah.
*Snyder, John J., Murphy's, Cal.
Solberg, Mrs. L. S., Salem, Ohio.
Solly, George A., Springfield, Mass.
*Solomon, M. E., Jeffersonville, Ga.
Sommer, Frank, Dorr, Mich.
Southall, G. H., Amelia C. H., Va.
Southgate, W. T., College Hill, Ohio.
Southwell, T., England.
Southworth, La G., Schuyler's Lake, N. Y.
Sowers, A. J., Bedford, Iowa.
Sparks, A. A., Mount Vernon, Ind.
Sparks, J., Vanceburgh, Ky.
Spearman, J. P., Papillion, Nebr.
Speer, Henry, Butler, Mo.
*Speir, E. W., Orlando, Fla.
Spence, P. B., Newport, Ky.
Spencer, George T., Kirksville, Mo.
Spencer, Miss Letta, Hudson, Mich.
Spencer, Thomas, Chariton, Iowa.
Spencer, T. P., Cleveland, Ohio.
Spencer, Walter, La Porte, Pa.
Spencer, W. B., Murfreesborough, N. C.
*Spilker, William G., Keatchie, La.
Spindler, V., South Saint Louis, Mo.
Spotts, Jas. C., Tazewell C. H., Pa.
Sprague, M. A., Smethport, Pa.
Spriggs, D. S., Caldwell, Ohio.
*Sproule, C. H., Elko, Nev.
*Sprout, J. H., Blue Earth City, Minn.
*Spurlock, James B., Versailles, Mo.
Stacy, J. B., Pulaski, Tenn.
Stafford, Pleasant, Sevierville, Tenn.
Stalker, John D., Hartsville, Tenn.
Stamper, I. J., Ducktown, Tenn.
*Stanles, S. K., Northville, Dak.
Stark, C. A., Belaloo, Wirrabara, South Australia.
*Stark, H., Trinidad, Colo.
Stark, W. B., Agricultural College, Miss.
Starnes, Hugh N., Marietta, Ga.
State Agricultural Dept., Auburn, Ala.
Stansill, P. W., Rockingham, N. C.
Stearns, Dan C., Berea, Ohio.
*Stearns, H. K., Mapes, Dak.
Stebbins, Charles D., Grand Rapids, Mich.
*Steeir, A. E., Hamilton, Tex.
Steele, F. K., Annapolis, Md.
Steele, John H., Pottstown, Pa.
Steele, L. A., Collamer, Ohio.
*Steele, T. D., Cassville, Mo.
Steele, W. A., jr., Camden, Tenn.
Steere, J. B., Ann Arbor, Mich.
Steinbeck, Will, Hollister, Cal.
Stephens, J. E., Homer, Ga.
Stephens, J. G., Stanardsville, Va.
Stephenson, C. V., Wyoming, Ohio.
Stephenson, William, Lovingston, Va.
Sterling, Dr. E., Cleveland, Ohio.
Sterm, E., Jefferson, Tex.
*Stern, J. T., Logan, Iowa.
Sterrett, Mrs. P., Pleasant Grove, Utah.
*Stetson, Ben, Plainview, Nebr.
Stevens, Sidney, North Ogden, Utah.
*Stevenson, E., Bristol, Dak.
Stevenson, Henry, Norwich, England.
*Stevenson, W. B., Manvel, Dak.
Stevenson, W. J., Oshawa, Ont., Canada.
Stewart, Alonzo H., Washington, D. C.
*Stewart, C. W., Alma, Nebr.
Stewart, Henry, Hackensack, N. J.
Stewart, Henry L., Middle Haddam, Conn.
Stewart, John, Woodstock, N. B., Canada.
*Stewart, T. J., Newberry, Mich.
Stewart, W. A., Lawrenceburgh, Tenn.
*Stewart, W. H., Woodville, Tex.
Stickney, Dr. P. L. B., Springfield, Mass.
*Stiles, Dr. E. P., Austin, Tex.
*Stinson, J. M., Bobbin, Tex.
Stiver, Peter, Lapeer, Mich.
*Stock, John, Fish Haven, Idaho.
Stockton, J. B., Toronto, Kans.
Stoddard, Mrs. G. S. F., South Woodstock, Conn.
Stoddard, W. L., Evart, Mich.
*Stokes, T. J., Macon, Miss.
Stolworthy, George, Franklin Falls, N. H.
Stone, D. D., Oswego, N. Y.
Stone, S. L. P., Urbana, Ohio.
Stone, Witmer, Germantown, Pa.
Storms, Edm. B., Berrien Springs, Mich.
Story, C. A., Tecumseh, Mich.
Stouf, W. L., Albany, Ky.
Stout, J. H., Decaturville, Tenn.
Stranahan, J. J., Chagrin Falls, Ohio.
Strange, John Q., Athens, Tenn.
Stratford, William R., Vevay, Ind.
*Stratton, N. L., Uvalde, Tex.
Stratton, W. W., Ashley, Ohio.
Street, D. T., Savannah, Tenn.
Street, George H., Malta, Ohio.
*Streeter, A. T., Calumet, Mich.
*Streiff, Joseph, Oakdale, Minn.
Strickland, H. L., Owensville, Ind.

Strickler, M., Bridgewater, Va.
Strider, J. H., Halltown, W. Va.
Strode, Dr. W. S., Bernadotte, Ill.
*Strong, E. A., Dushore, Pa.
*Strong, Harry B., Clay Center, Nebr.
Strout, Noyes E., Bedford, Ind.
*Stubbs, T. B., Baldwyn, Miss.
*Stutman, S. B., Windom, Minn.
*Suddath, E., Natchitoches, La.
Sugg, Jas. T., Snow Hill, N. C.
Suils, Harry H., East Liverpool, Ohio.
Suliot, Jas. W., Salem, Ohio.
Sullivan, Mrs. C. C., Louisa, Ky.
*Sullivan, C. M., Athol, Dak.
*Sullivan, J., Ashland, Wis.
Swaim, George M., Chatham, N. J.
Swallow, C. W., Tyngsborough, Mass.
Swan, John, Allegheny, Pa.
Swan, John M., jr., Newport, R. I.
Swaney, Rev. F. I., Wintersville, Ohio.
Swartz, W. T., Hagerstown, Md.
Swaysland, George, Brighton, England.
Sweaney, P. C., Larkin, Kans.
Swearingen, G. V., Sidney, Iowa.
*Sweet, D. E., Pipestone, Minn.
*Sweet, Eli, Millersburgh, Iowa.
*Sweet, George A., Granby, Mo.
Sweetland, L. R., Hamlin, W. Va.
*Sweetser, Andrew J., Cavour, Dak.
Swetland, B. L., Mount Vernon, Ohio.
Swetland, J. C., Sparta, Ohio.
Swift, F. J. C., Falmouth, Mass.
*Swiggett, A., Towanda, Kans.
Swint, William, Booneville, Ind.
*Taber, George F., Chaska, Minn.
*Tabor, John Q., Bryan, Tex.
*Taggart, J. H., Yuma, Ariz.
Talmadge, W. G., Hartford, Conn.
Tatem, C. E., Columbia, N. C.
*Taylor, C. E., Bronson, Fla.
*Taylor, C. N., Meckling, Dak.
*Taylor, E. A., Beloit, Kans.
*Taylor, F. H. G., Lake Providence, La.
Taylor, Hawkins, Washington, D. C.
Taylor, H. F., Fulton, Ky.
Taylor, I. A., Oxford, N. C.
Taylor, John S., Cumberland C. H., Va.
Taylor, J. E., Greenville, Mich.
Taylor, J. N., Lynchburgh, Tenn.
Taylor, J. P., Du Bois, Pa.
Taylor, J. R., New Kent C. H., Va.
*Taylor, S. W., Iuka, Kans.
Taylor, W. J., Greensburgh, Ky.
Teasdale, John, Potosi, Mo
Telgheder, Henry, Mount Airy, Ohio.
*Tennly, J. F., Federal Point, Fla.
Terens, N. H., Mishicott, Wis.
Terrell, John Allen, Bloomfield, Ky.
Teulon, Jas. A., Bradford, Pa.
Tevis, A. B., Home, Ind.
Thalaker, H., Petersburgh, W. Va.
*Thigpen, C. D., Sun Hill, Ga.
*Thigpenn, James A., Wadley, Ga.
Thistle, George P., Grantsville, Md.
*Thomarron, M. E., Yadkinville, N. C.
*Thomas, G. W., Canton, Miss.
Thomas, John J., Grantsville, W. Va.
Thomas, J. D., Jefferson, N. C.
Thomas, N. O., Erin, Tenn.
Thomlinson, J. R., Mount Pleasant, S. C.
Thompson, Ernest E., Toronto, Canada.
*Thompson, Jay, Gold Hill, Colo.
Thompson, J. J., Lake City, Fla.
Thompson, J. L., Redwood Falls, Minn.
*Thompson, J. M., Thatcher, Colo.
Thompson, M. S., Coudersport, Pa.
Thompson, Robt. J., Holman's Mills, N. C.
Thompson, S. T., Pocahontas, Ark.
Thompson, Waldo, Lynn, Mass.
*Thompson, William, Hallock, Minn.
Thompson, W. F., Happy Valley, S. Aus.
*Thomson, Matt, Alma, Kans.
Thomson, Wm., jr., Granite City, Utah.
Thorn, Z. E., Elizabeth, W. Va.
Thornton, W. P., Cuckoo, Va.
Thurston, W. J. Y., Clayton, N. C.
Tibbits, F. L., Grand Rapids, Wis.
Tillman, Walter, La Crosse, Wis.
*Tinsley, A. D., Sibley, Iowa.
Tisdall, C. J., Charlinch, Ont., Canada.
*Titcomb, George H., Waterville, Kans.
Toadvin, E. Stanley, Salisbury, Md.
Todd, Sereno Edwards, Orange, N. J.
*Tohim, Joseph W., Dadeville, Mo.
Tolliver, J. B., Lebanon, Tenn.
Tolman, John B., Lynn, Mass.
Tomlinson, H. E., Clarinda, Iowa.
Tomlinson, J., Shelton, Conn.
*Tomlinson, L. G., Hampton, Ark.
Tomlinson, Thomas, Tate Springs, Tenn.
Tompkins, W. H., Altoona, Iowa.
*Topleff, Joseph J., Longmont, Colo.
Townsen, Lebanah, Apollo, Pa.
Townsend, B. C., Bay Ridge, N. Y.
Tracy, C. O., Taftsville, Vt.
Trappmann, C. M., San Francisco, Cal.
Trask, R. S., White Cloud, Mich.
Traveller, Cornelius, Richmond, Utah.
*Traynor, L. J., Scotia, Nebr.
Treat, Willard E., East Hartford, Conn.

Trevett, Wesley, Highland, Kans.
*Trimble, N. C., Rusk, Tex.
*Trippe, T. M., Howardsville, Colo.
Tristram, Rev. Canon Henry Baker, Hartlepool, Durham, England.
Trombley, Jerome, Petersburgh, Mich.
Troop, Prof. James, La Fayette, Ind.
Trotter, Charles P., Milltown, Ind.
*Trovis, T. D., Holdrege, Nebr.
Tubbs, William, Monticello, Minn.
Tucker, C. D., Rockville, Conn.
Tucker, R. C., Burning Springs, W. Va.
Turner, E. W., Newton Falls, Ohio.
*Turner, B. E., Statesborough, Ga.
Turner, Prof. J. B., Jacksonville, Ill.
Turner, Jas. R., Poplar Grove, Ark.
Tusk, John W., Bardwell, Ky.
Tuttle, Mary E., West Windsor, Mich.
*Twamley, Fred, Minto, Dak.
*Tweedy, John, Aurora, Nebr.
Tyhurst, Margaret A., Huntingdon, Pa.
Tyler, A. L., Anniston, Ala.
*Tyler, V. L., Brookhaven, Miss.
*Tyner, E. S., Plant City, Fla.
*Ufford, George M., Wa Keeney, Kans.
*Ulmer, P., Houma, La.
*Underhill, Dr. C. B., Salida, Colo.
Urlwin, William, Salisbury, South Australia.
Vail, David A., Atlanticville, N. Y.
Van De Casteele, Edw., De Pere, Wis.
*Vandegaer, J. B., Many, La.
*Vanderhoop, Wm. A., Gay Head, Mass.
*Vandiver, R. K., Eaton, N. Mex.
Van Wye, G. P., Warren, Ohio.
*Van Zant, J. P., Edmonton, Ky.
Varjohar, H. H., Reading, Ohio.
Varner, C. P., Senatobia, Miss.
Varner, John A. R., Lexington, Va.
*Venable, McD. R., San Luis Obispo, Cal.
Verbeek, William, Holland, Mich.
Viallon, P. L., Bayou Goula, La.
Vincent, F. P., Cottage City, Mass.
Vogdes, Lieut. A. W., Fortress Monroe, Va.
*Vogt, J. E., Le Mars, Iowa.
Vogt, Louis O., Salem, Ill.
Voigt, Herman, San Francisco, Cal.
Volkening, H., Lenzburgh, Ill.
*Voorhees, A. W., Eckley, Colo.
Voorhees, David C., Blawenburgh, N. J.
Voorheis, Wm. G., South Frankfort, Mich.
*Voss, John E., Cottondale, Fla.
Waalkes, Martin, Muskegon, Mich.
*Wade, Henry C., Backusburgh, Ky.
Wade, Joseph M., Boston, Mass.
Wadsworth, Daniel S., Hartford, Conn.
*Wagner, Flora Z., Crandon, Dak.
Wagner, P. T., Calera, Ala.
Wagner, Silas A., Elk Lick, Pa.
Wagstaff, W. E., Cottam, Ont., Canada.
*Waite, D. B., Springwater, N. Y.
*Wakefield, John W., Apalachicola, Fla.
Walden, C. J., Fayette, Mo.
Walden, W. E., Watervliet, Mich.
*Waldron, E. H., Henry, Dak.
Walker, Arthur, Hitchcock, Tex.
*Walker, B. F., Dutch Flat, Cal.
Walker, C. H., Frostburgh, Md.
*Walker, H. N., Butler Centre, Iowa.
*Walker, Dr. James R., Excelsior, Minn.
Walker, Dr. R. L., Mansfield, Pa.
*Walker, R. T., jr., Trinty, Tex.
Walker, Thomas, Rawdon, Ont., Canada.
*Walker, Thomas W., Croydon, Utah.
*Walker, William, Scandia, Kans.
Wall, A. A., Vernon, Ala.
*Wallace, Henry C., Alta, Utah.
Wallace, J. K. P., Andersonville, Tenn.
Wallace, J. S., Brunswick, Mo.
*Wallace, R. B., Thomson, Minn.
Walsh, J. F., Humboldt, Nebr.
*Walters, Samuel, Rocky Comfort, Ark.
Walton, J. A., Germantown, Ky.
Walton, V. E., Byron, Ga.
*Walworth, Cyrus M., Loup City, Nebr.
*Ward, A. J., Beaumont, Tex.
*Ward, A. L., Fairmont, Minn.
*Ward, George W., Prattville, Ala.
Ward, Horace, Clarendon, Ark.
*Ward, S. M., Georgetown, S. C.
Ward, Thomas, Montrose, Iowa.
Warder, R. H., North Bend, Ohio.
Ware, Walter, Boyne City, Mich.
*Warner, A. B., White Rock, Kans.
*Warner, G. S., Coal Creek, Colo.
Warren, Dr. B. H., West Chester, Pa.
*Warren, J. L., Clear Lake, Wis.
Warren, Col., San Francisco, Cal.
Warson, Ed. L., Hillsborough, Ohio.
*Warson, Samuel, East Surry, Me.
Warwick, G. W., Smithville, Ga.
*Wasser, E. A., Girard, Kans.
Watkins, Albert, Lincoln, Nebr.
Watkins, Z. S., Ooletewah, Tenn.
Watlington, Thomas H., Stony Point, Ind.
*Watson, E. R., Kearney, Nebr.
*Watson, Harrie A., Wolsey, Dak.
Watson, J. E., Fulton, Mo.
Watson, L. F., Watseka, Ill.
Watson, Mary A., Kenansville, N. C.

*Watson, Will W., Fairbury, Nebr.
*Watson, W. I., Blandville, Ky.
Watts, George, Perry, Ohio.
Watts, S. R., Union, W. Va.
Weathers, E. W., Elkton, Ky.
Weaver, A. B., Clearfield, Pa.
Weaver, W. C., Front Royal, Va.
*Weaver, W. F., Will's Point, Tex.
Webb, A. H., San Francisco, Cal.
Webb, Charles W., Anderson C. H., S. C.
Weber, Dr. William, Evansville, Ind.
Webster, F. M., La Fayette, Ind.
Webster, Fred. S., Washington, D. C.
Webster, Jabez, Centralia, Ill.
Webster, W. F., Oshkosh, Wis.
Weeks, Rev. Leroy T., Osborne, Kans.
*Weems, John A., Flora, Ala.
*Wegener, H. F., Denver, Colo.
Weir, Robert C., Manassas, Va.
Weisbrod, A. W., Oshkosh, Wis.
Welch, Ben M., New Martinsville, W. Va.
*Welch, Noah, Glasco, Kans.
*Welch, T. J., Welch, N. C.
Wells, Oliver, Marshfield, Mo.
Welman, Z. L., Stoughton, Wis.
Welsh, F. R., Philadelphia, Pa.
*Wendel, George, Audubon, Minn.
Wentzell, C. B., Harper's Ferry, W. Va.
*Westcott, W. F., Duncansby, Miss.
*West, D. C., Perry, Iowa.
West, D. L., McMillan, Mich.
*West, E. E., Quitman, Miss.
*West, William, Chehalis, Wash.
Westbrook, M. H., Lyons, Iowa.
*Westbrook, W. H., Pine Bluff, Ark.
*Westergren, Charles, Marine Mills, Minn.
Westwood, Herbert W., Pennington, N. J.
Wetmore, E. P., Oxford, Ohio.
Whaling, O. M., Milltown, Dak.
*Wheat, B. P., Lewisville, Ark.
Wheaton, Dr. J. M., Columbus, Ohio.
*Whedon, F. L., York, Nebr.
Wheeler, Leonard W., Westford, Mass.
*Wheeler, Willard A., Atkinson, Nebr.
*Wheelock, L. L., Owatonna, Minn.
Wherritt, W. H., Lancaster, Ky.
Whitaker, Thomas H., La Grange, Ga.
Whitaker, T. L., Enfield, N. C.
White, A. C., Jefferson, Ohio.
*White, C. W., Greeley, Colo.
White, Frank, Murfreesborough, Tenn.
*White, G. C., Carson City, Nev.
White, G. H., Southampton, N. Y.
White, H. G., Taunton, Mass.
*White, J. H. C., Corpus Christi, Tex.
*White, L. W., Woodbine, Iowa.
White, Wm. S., Winchester, Va.
Whitehead, C. B., Bradford, Pa.
Whitehead, C. C., Tobinsport, Ind.
Whitehead, Jos. W., Fairfax C. H., Va.
Whitehead, Hon. Thomas, Richmond, Va.
Whitford, John D., New Berne, N. C.
Whitlock, R. A., Jonesville, S. C.
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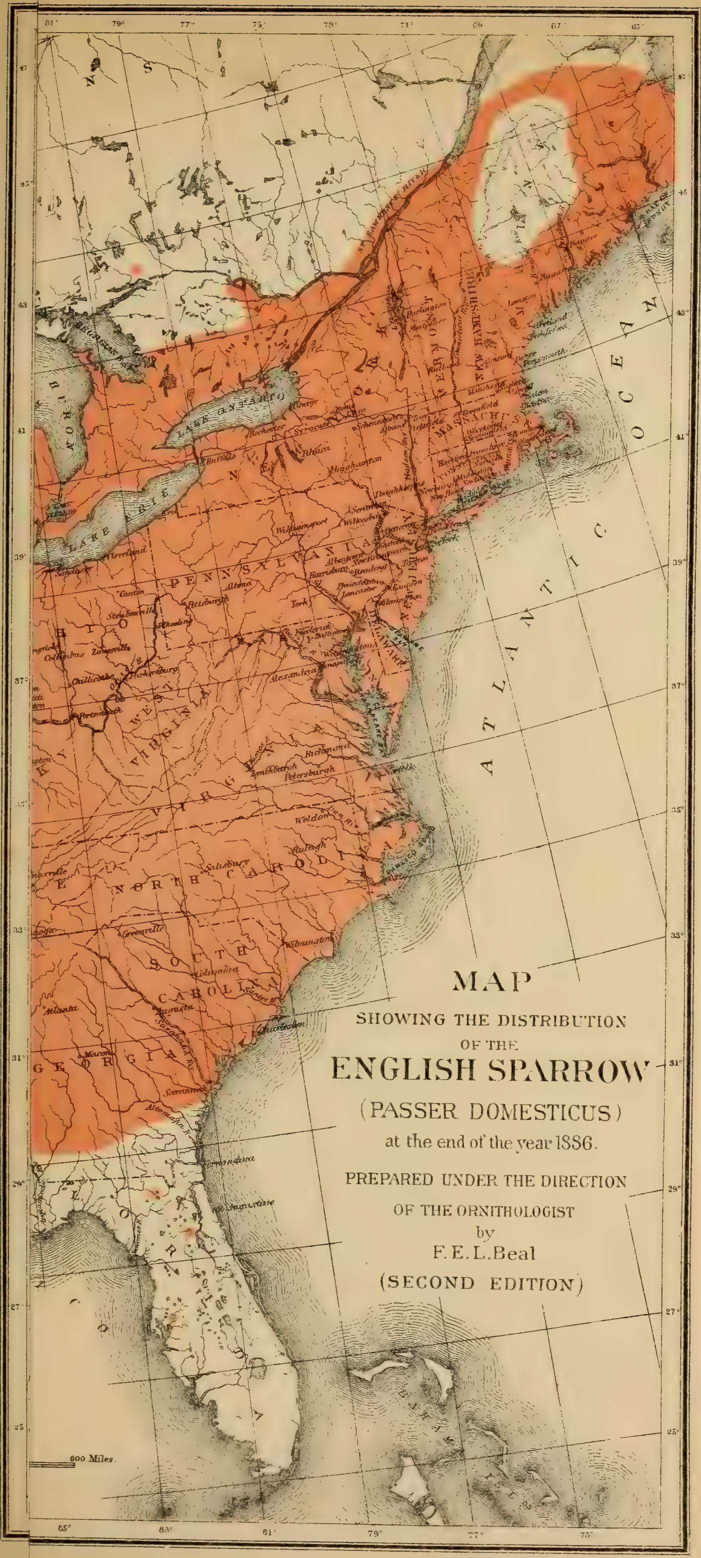
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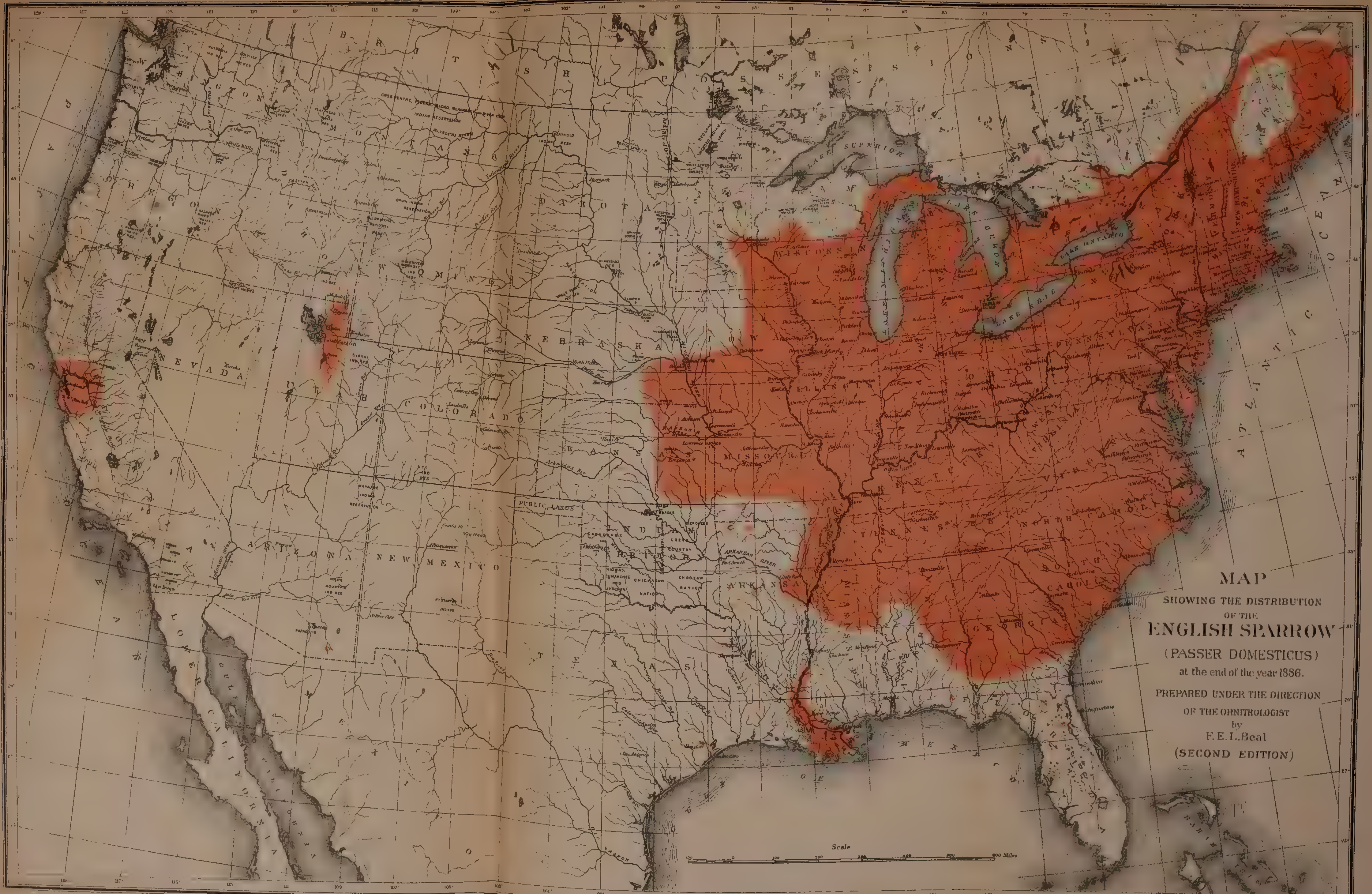
25°

MAP
SHOWING THE DISTRIBUTION
OF THE
ENGLISH SPARROW
(PASSER DOMESTICUS)
at the end of the year 1886.

PREPARED UNDER THE DIRECTION
OF THE ORNITHOLOGIST
by
F. E. L. Beal
(SECOND EDITION)

LITH. BY A. HOEN & CO. BALTIMORE, MD.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LOWER CALIFORNIA
GULF OF CALIFORNIA
MEXICO
Scale
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U. S. DEPARTMENT OF AGRICULTURE.
DIVISION OF ECONOMIC ORNITHOLOGY.
BULLETIN NO. 2.

REPORT
ON
BIRD MIGRATION
IN THE
MISSISSIPPI VALLEY
IN
THE YEARS 1884 AND 1885,

BY

W. W. COOKE.

EDITED AND REVISED BY DR. C. HART MERRIAM.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1888.

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LETTER OF TRANSMITTAL.

UNITED STATES DEPARTMENT OF AGRICULTURE,
DIVISION OF ECONOMIC ORNITHOLOGY AND MAMMALOGY,
Washington, D. C., July 20, 1887.

SIR: I have the honor to transmit herewith, for publication as Bulletin No. 2 of the Division of Economic Ornithology and Mammalogy, a special report upon Bird Migration in the Mississippi Valley in 1884 and 1885, by Prof. W. W. Cooke.

Respectfully,

C. HART MERRIAM,
Ornithologist.

HON. NORMAN J. COLMAN,
Commissioner of Agriculture.

PREFATORY LETTER.

The present report, which has been prepared by Prof. W. W. Cooke, with the assistance of Mr. Otto Widmann and Prof. D. E. Lantz, is the first fruit of the co-operative labors of the Division of Economic Ornithology of the Department of Agriculture and the Committee on Bird Migration of the American Ornithologists' Union. It consists of two parts: (1) an introductory portion treating of the history and methods of the work, together with a general study of the subject of Bird Migration, including the influence of the weather upon the movements of birds, the progression of bird waves and causes affecting the same, the influence of topography and altitude upon migration, and the rates of flight in the various species; and (2) a systematic portion in which the five hundred and sixty species of birds known to occur in the Mississippi Valley are treated serially, the movements of each during the seasons of 1884 and 1885 being traced with as much exactness as the records furnished by the one hundred and seventy observers in the district permit.

The chapters entitled "The Relation of Migration to Barometric Pressure and Temperature," and "A Study of the Bird Waves which passed up the Mississippi Valley during the Spring of 1884," are worthy of the most careful perusal; and the articles on the Kingbird and Purple Martin, in the systematic portion of the report, are particularly instructive. Indeed, I feel no hesitancy in expressing the belief that the present report is the most valuable contribution ever made to the subject of Bird Migration.

For the opinions herein expressed, relating to the theoretical questions involved in the study of Bird Migration, Professor Cooke alone is responsible. Some of these opinions are diametrically opposed to those held by the editor, but in a few instances only has the editor taken the liberty to add his views on the subject; in all such cases the interpolated remarks will be found in bracketed foot notes, over his initials. In fact, it has not been thought proper to make any changes in the First Part of the report, save the verbal alterations necessary in preparing it for the press. In the Second Part, or "Systematic Report," the case is entirely different, for this portion of the report deals with fact instead of theory. Here the editor has deemed it his duty to make the subject-matter conform to the present state of knowledge on the subject. With this end in view, changes have been made freely, and the portions relating to the geographical distribution of the various species and subspecies have been largely rewritten. In this task the editor has received invaluable assistance from Mr. Robert Ridgway, Curator of Birds in the U. S. National Museum.

The nomenclature adopted is that of the new Check List of the American Ornithologists' Union, with the additions and corrections contained in Ridgway's Manual of North American Birds, which, fortunately, became available just as this report was going to press. The number in brackets following each name is that which the species bears in Ridgway's Nomenclature of North American Birds, as published in Bulletin 21 of the U. S. National Museum, 1881.

The admirable map which accompanies this report has been prepared under the supervision of Mr. Henry Gannett, chief geographer of the U. S. Geological Survey.

My own connection with the report has consisted in bringing together under the head of each species the matter contributed separately for the two years; in arranging it in accordance with the nomenclature of the American Ornithologists' Union; in revising* the systematic portion of the report (Part Second); in incorporating the original Appendix† into the body of the text, and in the editorial revision of the manuscript of the whole report—a labor which, for the past year and a half, has consumed all of the time not required in the performance of my routine official duties.

C. HART MERRIAM,
Editor.

WASHINGTON, D. C., *July* 20, 1887.

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* This revision has consisted in rewriting the *habitats* of most of the species and subspecies; in casting out some forms which had been included upon erroneous identification or insufficient evidence; in correcting statements of fact; in transferring (in a few cases) the notes sent under a stated species or subspecies to a nearly related species or subspecies known to inhabit the region under consideration to the exclusion of the form reported; in the addition of a number of species and subspecies now known to inhabit the region; in the insertion of additional matter under species already given; in the interpolation of authorities for second-hand statements; and in the omission of matter of questionable reliability. In all of these directions the editor feels that the report is susceptible of still further improvement, but want of time and reluctance to longer delay the publication of an already long-delayed and much-clamored-for document must be his excuse for its incompleteness and imperfections.

† The original appendix consisted of a very briefly annotated list of about one hundred and forty birds supposed to inhabit the District, but concerning which no reports had been received from our observers. Some of these have been eliminated, as resting upon insufficient evidence; the remainder, for the convenience of those who use this book, have been incorporated in their proper places in the general text, accompanied by a statement of their geographical distribution, and such other facts of interest as might be added without too greatly increasing the bulk of the report.

FIRST PART.

BIRD MIGRATION IN THE MISSISSIPPI VALLEY.

By W. W. Cooke.

In the winter of 1881–'82 the attempt was made to secure the assistance of the ornithologists of Iowa in studying the migrations of birds; but a change of residence on the part of the author from Iowa to Minnesota necessitated a modification of the original scheme, and it was decided to increase the size of the area to be investigated so as to include the whole Mississippi Valley. All the ornithologists of that district were invited to co-operate by contributing notes on the winter birds and reporting dates of the spring arrivals. Answers were received from 26 persons who promised to aid in the work, but at the end of the season it was found that but 13 had actually forwarded observations. These 13 were distributed as follows: Arkansas, 1; Missouri, 2; Kansas, 1; Illinois, 3; Nebraska, 1; Iowa, 2; Minnesota, 2; Wisconsin, 1. Thus it will be seen that a small part only of the Mississippi Valley was represented. The notes contributed were published, without comment or change, in Forest and Stream for October, November, and December, 1882.

The same work was undertaken for the spring of 1883, and, by a liberal use of the press, a much larger corps of observers was obtained. The names of 42 persons were received, but of these 26 only furnished reports. They were distributed as follows: Texas, 1; Mississippi, 2; Tennessee, 1; Kansas, 2; Arkansas, 1; Missouri, 3; Illinois, 7; Iowa, 4; Wisconsin, 2; Minnesota, 3—thus leaving Louisiana, Indian Territory, Nebraska, and Dakota with no representatives.

The larger part of the hundreds of notes received from these observers was never written up, and for that reason frequent reference will be made to them in the present report.* Some of the species were treated in the Ornithologist and Oölogist for 1883, and the full notes from two of the stations appeared in the American Field for December, 1883, and January, 1884, and were afterwards issued as Bulletin No. 1 of the Ridgway Ornithological Club of Chicago.

The founding of the American Ornithologists' Union (in September, 1883) greatly enlarged the scope of the work, but did not materially

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[* Since the above was written most of these notes have been printed in the Ornithologist and Oölogist.—C. H. M.]

alter its character. As is well known, this society was formed of the most prominent ornithologists of North America, and gathered to itself the best of the younger active field workers.

When, therefore, it was announced that, at the first meeting of the new Union, "a committee was also appointed on the 'migration of birds,' to co-operate with Mr. W. W. Cooke in connection with his work on this subject in the Mississippi Valley, and consists of the following gentlemen, with power to add to their number: Merriam, Brown, Purdie, Wheaton, Chamberlain, Grinnell, Henshaw, Cory, Merrill, Fisher, Bicknell, Mearns, and McIlwraith,"* a new impulse was given to the work, and ornithologists all over the district hastened to send their offers of aid.

Under the efficient management of the chairman of the committee, Dr. C. Hart Merriam, arrangements for the spring campaign were soon completed. The whole of the United States, British America, and Alaska were included in the scheme, and the field was divided into fourteen districts, each under the charge of its own superintendent. The superintendency of the work in the Mississippi Valley remained in the same hands as for the two previous years, and the district was made to include Mississippi, the portions of Kentucky and Tennessee west of the Tennessee river, Illinois, Wisconsin, the northern peninsula of Michigan, Louisiana, Arkansas, Missouri, Iowa, Minnesota, Texas, Indian Territory, Kansas, Nebraska, Dakota, and Manitoba.

The work begun in the Mississippi Valley December 1, 1883, under the auspices of the American Ornithologists' Union, has been carried on uninterruptedly to the present date. Its progress has been chronicled from time to time in The Auk, and in the Ornithologist and Oölogist, in which latter magazine, for May, 1884, appeared a list of the observers and a rough map of the district, showing the location of the stations. Since then the names of many new observers have been added until the number at the close of the season of 1884 was 160. Reports on spring migration in 1884 were received from 109 stations. These reports may be characterized as follows: Merely a few notes, 25; a scattered report on the whole or a part of the migration, 50; a full report on the whole migration, 34. These 109 stations were distributed over the Mississippi Valley as follows: Mississippi, 6; Tennessee, 1; Illinois, 22; Wisconsin, 14; Louisiana, 2; Arkansas, 1; Missouri, 9; Iowa, 18; Minnesota, 11; Texas, 4; Indian Territory, 2; Kansas, 5; Nebraska, 3; Dakota, 8, and Manitoba, 3.

Reports were received on the fall migration of 1884 from about half a dozen observers. Individually, these reports were of a high grade of excellence, but their number was too small to allow of any accurate tracing of the southward movements of the various species. They will be found incorporated in the body of this report.

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* Bull. Nutt. Ornith. Club, Vol. VIII, 1883, p. 225.

THEORETICAL CONSIDERATIONS.

Before proceeding to treat in detail of the phenomena presented by the records of the migration observers, it may be well to glance for a moment at the general causes of migration, and at some of its more striking and interesting features.

Without entering into a discussion of the causes which long ago started birds on their periodical change of habitation, we shall not be far out of the way in considering their present migrations the result of inherited experience. To be more explicit, the first migrations were doubtless very limited in extent and probably were intelligent movements which through repetition became habitual, and the habit was transmitted from parent to offspring until it has become, as we see it now, the governing impulse of the bird's life. It is undoubtedly true that love of the nesting ground, which is to them their home, is the foundation of the desire for migration;* and year after year they find their way thousands of miles back to the same box or tree by the exercise of memory—not always the memory of the individual, but the memory inherited from numberless preceding generations which have passed and repassed over the same route.

In the study of the yearly cycle of migrations there are two movements for which we must seek the cause—the restless pushing northward in the spring, in spite of cold, rain, sleet, and snow; and the southward journey in the fall. We have already stated that the northward movement is caused by a strong home love—an overpowering desire to be once more among the familiar scenes of the previous summer. The return movement is obviously the result of two causes—the approach of winter and the failure of the food supply. Of these two, the latter is probably by far the more powerful, since it is well known that single individuals of species which retire far to the south often remain behind, and, favored by an abundance of food, withstand the most severe weather. Thus, many Red-headed Woodpeckers remain through the winter in the cold climate of northeastern New York, frequenting the heavy timber where there is a great quantity of their favorite food;† and it is not unusual for a few Robins to spend the winter in north-central Wisconsin, sheltered in the thick pine forests; while Ducks and even Wilson's Snipe have been known to remain throughout the whole

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[* I cannot concur with Professor Cooke in the belief that "love of the nesting ground * * * is the foundation of the desire for migration." In a lecture on Bird Migration which it was my privilege to deliver in the U. S. National Museum, April 3, 1886, I said: "Some ornithologists of note have laid special stress upon the '*strong home affection*' which prompts birds to leave the South and return to their breeding grounds. To me this explanation is forced and unnecessary. Birds desert their winter homes because the food supply fails; because the climatic conditions become unsuited to their needs; because the approach of the breeding season gives rise to physiological restlessness; and because they inherit an irresistible impulse to move at this particular time of the year."—C. H. M.]

† Merriam, Bull. Nutt. Ornith. Club, Vol. III, No. 3, July, 1878, pp. 123–124.

winter in Wyoming, near the hot springs, whose warmth keeps the neighboring waters and ground from freezing. Nevertheless, it is as yet unexplained why some birds, notably many of the warblers, retire in winter to such a great distance south, some even crossing the equator and passing several hundred miles beyond. Certainly neither cold nor hunger can be the cause of such wanderings.

It has been often noticed that during the fall migration many birds seem to be able to foretell the approach of storms from the north, and hurriedly depart southward, before human eyes can detect any signs of the coming change. There is a large accumulation of evidence on this point, all seemingly in support of the proposition which has been formulated by one of our leading ornithologists in the following words: "Birds discern approaching meteorological changes."* Some ornithologists deny this, saying that in such cases the birds have out-traveled the storm, in which they were at first caught, their superior powers of flight enabling them to pass ahead of it; or that they have been warned by the hasty approach of more northern birds coming from the area over which the storm was moving.

If we study fall migration merely, there seems to be no doubt of the truth of this statement, but if we include spring migration the question becomes much more involved. If birds discern approaching meteorological changes, why is it that so many thousands perish each year by being caught in storms and frozen to death? Certainly an approaching storm in spring must give just as plain and early a warning as one in the fall, yet the same birds which are said to foresee it at the latter time and escape, rush blindly forward a few months later and are overtaken, their death paying the penalty of their rashness. The hardy waterfowl (Ducks and Geese) push northward in the spring, encounter storms, and are turned back, only to repeat the same thing a dozen times before they reach their summer quarters, but each time, instead of avoiding the approaching storm, they do not retreat until its actual presence drives them back. If they can foresee these changes, then their love of home and their desire to return to it must be wonderfully strong.

SPEED AT WHICH BIRDS MIGRATE.

In studying the speed at which birds proceed northward in their migrations one is beset by many difficulties. To determine the comparative speed of the several species is easy enough, but to determine the absolute rate—the exact number of miles which a particular bird makes during one day's journey—is beyond our power. If migration were a steady movement northward, with the same individuals always in the van, numerous careful observations might make it possible to arrive at an approximation to the truth; but instead of this, migration is performed something after the manner of a game of leap-frog. While in the fall migration the younger birds lead,* in the spring they loiter behind, and it is the old birds, those in whom we may suppose the love of home and the desire for procreation are strongest, which press forward so eagerly. Moreover, of these old birds, those which arrive first at a given place, as a rule, are birds which lived there the previous summer and which will remain there to breed.† Thus the vanguard is constantly arresting itself, and the forward movement must await the arrival of the next corps, which may be near at hand or far in the rear. The movement of migration, then, is made up of a series of constant overlappings, and the real speed is evidently much greater than the apparent. Of this real speed of transit we can take no account, and our calculated rates, therefore, are of value only in so far as they show the relative speed of migration of the different species. In the accompanying report the speed of migration is calculated in the following manner: The most southern reliable record is selected for comparison with the most northern record of the same character; the distance in miles between these two stations is divided by the number of days elapsing from the time the species made its appearance at the southern station to the date at which it was seen by the northern observer. The result gives the average daily rate of migration in miles for the species. For example: The Baltimore Oriole was seen at Rodney, Miss. (lat. 31° 52′), April 7. It was not seen at Oak Point, Manitoba (lat. 50° 30′), until May 25. It was therefore 48 days in passing over the 1,298 miles between the two stations, which gives an average speed of 27 miles a day. This subject will be treated as thoroughly as possible, since it has received little or no attention heretofore; indeed, there were no data in existence for its study until the notes were collected on which the present report is based.

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*J. A. Allen, in Scribner's Monthly Magazine for October, 1881, p. 938.

The first records published in this country relating directly to the speed at which birds travel appeared in the Ornithologist and Oölogist for January, 1884 (pp. 1 and 2). These notes were based on the records of six species in the spring of 1883; and though the notes for 1884 are many fold more numerous they do not give grounds for a change in the general rate of speed set forth in that article. It must be kept constantly in mind, however, that no complete and scientific study of the subject is as yet possible, and that the present records are given merely because they are the best now obtainable, and because they may furnish some material for the use of the future student.

The records of fifty-eight species for the spring of 1883 give an average speed of 23 miles a day for an average distance of 420 miles.

[* The opinion here expressed by Professor Cooke, namely, that in fall young birds migrate before their parents, has been long accepted in Europe, but is contrary to the experience of most leading American ornithologists and to the evidence collected by the Committee on Migration of the American Ornithologists' Union, as will appear in a future publication of the Division. See, also, Mr. Brewster's recent essay on the subject, in the Memoirs of the Nuttall Ornithological Club.—C. H. M.]

[† This statement needs much qualification.—C. H. M.]

A slightly smaller number of species for the spring of 1884 give exactly the same average speed over an average distance of 861 miles. Hence it is probable that future observations will not materially change this estimate.

A study of the records for 1883 led to the statement that in spring birds migrate more rapidly in the northern portion of their routes of travel than in the southern. As this statement was based on the notes of one year only, it became a matter of much interest to ascertain whether the facts observed would hold good in future seasons and thus admit of formulation as a general law, or whether they had been the results of specially favorable conditions in the latter part of a single season. Accordingly, in the spring of 1884, twenty-five species of well-known birds, concerning which we had full records, were selected for careful study. The result bears out the foregoing statement. The distance traveled was divided as nearly as possible into two equal portions and the speed was calculated for each. Some of the records do not admit of division; others show an equal speed throughout; while six show an increase of 77 per cent. in speed for the northern half, and three show a decrease of 47 per cent. Thus it will be seen that the record is strongly in favor of the increase. The same result may be reached by calculating the average speed of these twenty-five species separately for each of the different months in which migration is performed; the average speed for March is 19 miles, for April 23 miles, and for May 26 miles, per day. The record for 1884 also confirms the statement that the later a bird migrates the higher average speed it will attain. This would naturally be inferred from the preceding remarks.

These calculations are averages which give the rate of speed at which the bird would travel provided it moved regularly each day. But we know that many pauses occur, that on many days there is no advance; hence, on the days of movement the speed must be much higher than that given. This is clearly seen in the case of the Purple Martin. From latitude 38° 40′ to 46° its average rate is but 13 miles a day; but we have good reason to believe that there was a pause from April 3 to April 14, and another from April 18 to May 3. Taking out the first of these pauses, the rate is raised between latitude 38° 40′ and latitude 43° 43′ to 35 miles a day, and, not counting the second pause, the rate for the rest of the distance is 28 miles.

We must also take into consideration the fact that in all probability the same bird seldom migrates for several nights in succession, but stops to rest after a flight of a night or two, so that the birds migrating one night are not the same individuals that were moving the night before.

It has been stated above that the average rate for April is greater than that for March, and is exceeded by that for May; but it cannot be said that the actual number of miles performed in a night's journey is therefore greater. This may or may not be the case. The facts observed will be sufficiently clear if it is remembered that the later in the season a species moves the less hindrance it will meet from the elements, and the fewer pauses will be necessitated in its journey. During the month of May there are few if any nights in which migration does not take place; while a bird that migrates in March must expect to be stopped by storms at least one week in four.

In regard to the relative speed at which the different species travel, all that can be said at present is that those which migrate later have, as a rule, the highest rate. Thus the average speed of the Robin, Cowbird, and Golden-shafted Flicker is about 12 miles a day, while the average of the Summer Redbird, Baltimore Oriole, Ruby-throated Hummer, and Nighthawk is 28 miles. If we try to calculate the relative speed of the different families, we find that some of the species in a family migrate early and slowly, others late and rapidly, bringing the average of most of the families very close to the general average of all, which, as already stated, is 23 miles a day.

Birds have seldom been seen while on their way in undisturbed migration at night. The observations given by W. E. D. Scott and J. A. Allen (Bull. Nutt. Ornith. Club, Vol. VI, 1881, pp. 97–100, and 188) are the most important, but in these nothing is said concerning the speed at which the birds were supposed to be moving. It is known that birds do not move rapidly, as a rule, when migrating in the day-time, but from the meager material at hand it may be inferred that the speed at night is considerably greater. During day-migration the smaller land birds rarely fly faster than 15 miles an hour, though the larger birds, such as Cranes, Geese, Ducks, etc., move much more rapidly. At Red Rock, Ind. Ter., between August 25 and September 5, 1884, the Cliff Swallows and Nighthawks were conspicuous every morning and evening, slowly drifting south and southwest in their fall migration. For an hour and a half parties of birds would pass by in almost unbroken succession. Many hundred Nighthawks were seen during a single evening, and the number of Swallows was much greater. The result of timing them on several occasions gave a rate of about 10 to 14 miles an hour, the former being the more usual speed. This slow rate was caused by the irregularity of the flight, as the birds captured their evening and morning meals on the wing. The morning flight lasted an hour only, and was made at about the same speed. Thus a distance of about 30 miles would be traveled by each individual during the morning and evening together, but no one can say how much farther, if any, they traveled during the night.*

The advance of the hosts of Warblers, as they move incessantly forward from tree-top to tree-top, is still slower, probably being but a few miles during a whole day. Geese in their northward flight along the

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[* The material gathered from the keepers of light-houses seems to indicate that neither Swallows nor Nighthawks migrate to any extent after night fall.—C. H. M.]

Atlantic coast traverse great distances, sometimes covering from 300 to 600 miles at a single flight; and it cannot be said positively that the larger birds do not do the same over the land. Still, the records so far made seem to indicate that the smaller land birds, such as Warblers, Finches, and the like, do not perform long journeys at one time when over land, but their voyages over the Gulf of Mexico prove that even these small species possess great power of flight.

The preceding discussion shows that we are entirely wanting in exact knowledge on the subject, and that for some time to come all we can hope to do is to gather material. In this connection the facts accumulated by the keepers of light-houses are of the utmost importance, and the publication of the report containing these data is looked for with great interest.

THE RELATION OF MIGRATION TO BAROMETRIC PRESSURE AND TEMPERATURE.

In studying the spring migration of 1884 use was made of the tri-daily weather reports of the Signal Service, of which about 50 stations were in or near the Mississippi Valley. These reports give the temperature, state of barometer, dew point, direction and force of wind, amount of rainfall, and character of the sky. The observations on which they are based were taken at 7 a. m., 3 p. m., and 11 p. m. In the following study the 11 p. m. records were used for those birds which migrate by night, and the 7 a. m. records for such species as Ducks and Geese, which perform the bulk of their movements in the forenoon.

To render the study more easy, weather maps were made, one for each day, based on the 11 p. m. observations. The maps were made as nearly as possible like those now printed daily by the Signal Service at Washington; that is, the state of the weather and the direction of the wind were marked at each station on the map in symbols which are plain and easily comprehended, so that the eye could take in at a glance the general state of the weather in the whole Mississippi Valley. At each station the temperature, state of barometer, and force of wind were indicated. Dotted lines were then drawn connecting all places having the same temperature, and solid lines connecting places of equal barometric pressure. The former, called isothermal lines, were drawn for every five degrees of Fahrenheit; while the latter, called isobaric lines, were drawn for every tenth of an inch of pressure. The area of the lowest pressure is never stationary, but is constantly moving, and in an easterly direction. It may be moving northeast, east, or southeast, and rarely north or south; but never northwest, west, nor southwest. The usual direction in the Mississippi Valley is a little south of east. It so happens that the particular wave which we study moves northeastward, but this is an exception to the general rule. Though it may move south or north for a time, it will surely turn east in the end. In the body of the report, under the Purple Martin, the relation of migration to atmospheric cold and warm waves is discussed, and the statement is there made that the warm waves begin in the northwest and move toward the southeast. The cause of this lies in the movement of the area of low pressure. It is a law of the movement of winds that they go toward an area of low pressure, and from an area of high pressure. If, then, an area of low pressure develops, say in southwestern Dakota, it will be but a few hours before a south or southeast wind will be blowing over Nebraska and Kansas, and a warm wave will be started in these States. As this area passes eastward to Minnesota its effect will begin to be felt in Iowa, Missouri, and Arkansas, while by the time it has reached Lake Michigan it will probably have produced southeast winds even to the Gulf of Mexico. But an area of low pressure is followed by one of high pressure, producing an opposite effect, and the isotherms which bent north to welcome the coming of the low area turn rapidly southward before the icy breath which blows from an area of high pressure. Thus the cold and warm waves both come from the same quarter, and both move in the same direction; that is, the direction in which the area of low pressure is advancing. Since it is known that low pressure is generally accompanied by clouds and rain, while areas of high pressure are cloudless, it would be naturally supposed that migration would take place during high pressure; but, as has already been stated, the area of low pressure attracts a south wind, and the increased warmth more than overbalances the cloudiness. Fully 60 per cent. of the spring migration of 1884 took place in cloudy weather. It is probable, though I am not aware that it has as yet been proved, that in the fall migration the reverse is the case, and the larger movement takes place in clear weather.

Following is a full record of the relation of migration to atmospheric conditions for the seven days from March 19 to 25, 1884, contrasted with a week's migration in May.

March 18, 1884, at 11 p. m., there was no marked atmospheric disturbance throughout the United States. The minimum of the cold wave had occurred the day before and the temperature was gradually rising in the Upper Mississippi Valley. It is this part of the Mississippi Valley (from latitude 39° northward) to which the present study is confined. The temperature was quite high (50° at Saint Louis, and 37° at Saint Paul), but fell rapidly from Saint Paul northward till it reached 20° at Moorhead, Minn.* The barometer varied only two-tenths of an inch from 29.9 inches in eastern Arkansas and southern Illinois to 30.1 at Moorhead, Minn. The prevailing winds were very light E. to N. The weather was cloudy, with several light rains. There was little change toward the morning of March 19, except the shifting of the wind to N. and NW., while the area of low pressure moved east to Cape Hatteras. Very little migration took place, and the few birds that were moving northward may be well called "birds of the first wave," that is, Ducks, Geese, Blackbirds, Meadowlarks, Robins, and Bluebirds. These are the birds with which we have to deal in the study of these seven days. Migration was reported from southern Wisconsin and northern Illinois, against a northeast wind, with the temperature but two or three degrees above freezing, and from east-central Kansas under slightly warmer conditions. It seems likely that some of these notes belong to a warm wave which occurred two days before, but it is also certain that some Ducks and Geese were migrating in the early morning hours, straight against the northerly winds.

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* It need hardly be said that no one can follow these remarks intelligently without referring to the map accompanying this report.

March 19 at 11 p. m. an area of slightly lower pressure had just passed over the Upper Mississippi Valley, and the barometer rose steadily all night. Between Saint Paul and Saint Louis the temperature remained the same as the day before; northward it was slightly higher; the winds were light, and were everywhere from NE., NW., and W. The temperature ranged from 45° at Saint Louis to 25° at Moorhead. The average barometer, at 11 p. m., was 30.07 inches, and at 7 a. m. of the 20th, 30.15 inches. Cloudy weather was reported everywhere except in the Lake Superior region. In general, the condition may be said to have been very unfavorable for migration, yet new arrivals were still noted from the same places as on the day previous, with the addition of records from southeastern Dakota, eastern Iowa, and south-central Iowa. It would seem that the Ducks and Geese were so desirous of reaching their breeding grounds that they pushed northward in spite of the wind and the clouds, as soon as the temperature rose two or three degrees above freezing, regardless of the fact that the winter's snow still covered the ground, and the lakes and rivers were still bound with ice. Not until a week later did any streams open in the region which was now being invaded by the migrating hosts.

March 20 was characterized by very high barometer and by a marked advance of the isotherm of 30° to points north of Duluth and Moorhead. There was no place in the Upper Mississippi Valley at 11 p. m., March 20, where the pressure was less than 30.2, and in western Dakota it was 30.3. Calm weather or very light north winds prevailed, with clear weather along the Mississippi and the Great Lakes, and cloudy weather with light rains on the Missouri. The minimum temperature at Saint Louis was 43°; at La Crosse 37°; at Saint Paul 20°, and at Moorhead 23°. It was a moderately fair night for migration. The culmination of the high pressure was reached, and already in the southern Rocky Mountain region the low pressure was developing which was to bring about the immense movements which took place during the next three days; already the isotherms in that quarter were beginning to move northward and the wind along the Gulf coast had changed to SE. The birds seemed to have a foreknowledge of the approaching change, for twice as many 'firsts' were recorded as during the two previous days. Some of these came from central Missouri, where the change was at this time slightly felt. The main portion came from the same districts as on the day previous. There was practically no advance of the van, but a filling up of the country already traversed by the scouts.

On the night of March 21, at 11 p. m., an area of low barometer (29.9 inches) was passing eastward across the Upper Mississippi Valley and was central at North Platte, Nebr. It produced SE. winds of moderate strength in all the Mississippi Valley except the extreme northern part, above La Crosse. The temperature rose throughout the district to 56° at Saint Louis and 35° at Saint Paul; but north of this, beyond the influence of the SE. wind, it fell rapidly to 18° at Moorhead and 11° at Saint Vincent. The isotherm of 40° was carried up to La Crosse. As morning approached, the temperature still rose in the northern part and the sky became overcast with some local clouds and rain. It was a night of much migration, owing to the influence of the area of low pressure, which at 7 a. m., March 22, was central at Omaha and Yankton, where the barometer at 3 p. m. registered 29.74 inches. This was a fall at Yankton of .32 inch during sixteen hours, while the center of the low area moved but a few miles; and the necessary result was a great rise in temperature and consequently great movements among birds. But the movements took place only to the east of the low pressure area; for it is a law of atmospheric circulation that the winds are attracted from the south, not directly toward the center of the low pressure area, but toward places to the east of it in the same direction that it is moving, while the winds which it attracts from the north move toward places to the west or behind it. Migration, therefore, would be looked for in vain to the south, west, or north of Yankton. The whole of this immense movement, which in number of records was as great as that of the three previous days together, and in number of individuals was many times greater, took place to the southeast and east of Yankton. The SE. winds prevailed up to La Crosse, and this place also marked the limit of the night's movement in that direction. A map was made of the migration which took place on this day, and it was found to cover a very nearly circular area, 250 miles in diameter, the center of which was midway between Keokuk and Davenport. Some idea of the great number of birds which were migrating during this night may be had from the fact that at Saint Louis twenty-six different species were noted as having arrived or increased. It is well to bear in mind that all these birds were migrating on a rapidly falling barometer, hence in the face of what is usually considered a sign of an approaching storm; and it may be noted also that all this great movement did not advance the van, which remained where it had been before.

March 23, bird migration was at a standstill. The area of low pressure, which was central at Yankton in the afternoon of the 22d, had moved to Saint Paul by 11 p. m., the barometer falling steadily to 29.61 inches. During the night it moved NE. to Marquette, Mich., falling still more to 29.56 inches. In the mean time an area of high pressure developed at Dodge City, Kans. The effect on the wind was as follows: From Saint Louis southward the winds began to shift to SW.; to the northwest of that place they became NW. and N.; while to the northeast of Saint Louis they shifted to SW. and W. As would be expected, those places which had W. and NW. winds had clear skies, while the district from Saint Paul and La Crosse to Chicago and eastward was cloudy. The temperature from Saint Paul northwest, north, and northeast rose. At Saint Paul it was stationary, and thence southward it fell a few degrees, but still remained warm. The wave of migration seems to have exhausted itself in a single night. Some forty 'firsts' were recorded for this day, but, except at two places, they seem to have been arrivals of the previous day, which had been overlooked. These two stations, Waupaca, Wis., and Heron Lake, Minn. (with its neighborhood), furnished one-half of the forty records, and both are on the northern edge of the district covered by the preceding night's migration. It seems, then, that at these places there was a local, though, in the case of Heron Lake, a very large migration.

March 24 was marked by cloudy weather after a clear night. Southerly winds prevailed over the Upper Mississippi Valley, varying from SE. to SW., and mostly light. The temperature had fallen, on an average, 5° from Chicago to Bismarck and northward. It had risen strongly 9° to 11° at Yankton and Omaha, this rise probably being the cause of the arrival of immense numbers of water-fowl during the day at Heron Lake, Minn., all coming from the west, that is, from the direction of Yankton, at which place at 7 a. m. a S. wind was blowing. It was a day of general low pressure. The whole district, from Cairo to Moorhead, was included between 29.80 and 29.89 inches. Northward and eastward, in Manitoba and at Marquette, Mich., the barometer fell to 29.65; in the southwest, at Fort Smith, Ark., it fell to 29.71; and westward, at Deadwood, Dak., it rose to 30. An area of low pressure developed at Fort Smith, Ark., in the early evening of March 23, and became pronounced during the next twenty-four hours. At 7 a. m. of the 24th the effect of this area was hardly felt, but by night the wind had been attracted to it over most of the Upper Mississippi Valley, bringing from the north colder, clearer weather. This day, therefore, was the turning point, and the beginning of a cold wave which was already felt to the northwestward of Cheyenne. The temperature at 11 p. m., March 24, was 47° at Saint Louis, 42° at Chicago, 50° at Des Moines, 37° at Saint Paul, and 32° at Moorhead.

This was the last day of the warm wave which commenced on the evening of March 21, and the birds made the most of their opportunity and advanced a whole degree farther north. The hosts which had rested during the night of the 22d moved forward and fully occupied all the country up to latitude 45°, with an innumerable host along the Mississippi River at 45° 25′, and scouts up even to 47° on the Missouri.

That this was the culmination is easily seen from the records, which fell from seventy-three notes on the 24th to but seventeen the next day.

Let us now calculate the average conditions under which birds were migrating during these seven days. A few more than three hundred records of 'firsts' were contributed for these seven days, and the temperature at which the species were migrating is found to be as follows: 25°, one record (a Goose, in more senses than one); 29°, a cousin to the last; 31°, eighteen firsts; 33°, twelve firsts; 35°, eleven firsts; 37°, forty firsts; 39°, forty-one firsts; 41°, fifty-two firsts; 43°, sixteen firsts; 45°, twenty-five firsts; 47°, five firsts; 49°, seventeen firsts; 51°, nine firsts. Thus it will be seen that the favorite temperature for migration of "birds of the first wave" ranges from 37° to 41° Fahrenheit.

In cloudy weather there were 143 records; in clear weather 101, or exactly 60 per cent. cloudy, to 40 per cent. clear.

With reference to the wind, it has been found that with the wind north there were 29 records; NE., 31; E., 12; SE., 75; S., 23; SW., 27; W., 39; and NW., 9. It will be noticed that the most unfavorable winds, namely, the E. and NW., are directly opposite those winds which have the greatest number of records. Combining, we have for E. and W., 51 records; for NW., N., and NE., 69; and for SE., S., and and SW., 125 records, showing how greatly the birds prefer a southerly wind to help them on their journey.

The effect of barometric pressure will appear from the following statement: March 19 there were 24 records with an average pressure of 30 inches; March 20, 35 records at 30.04 inches; March 21, 43 records at 30.24 inches; the 22d, 82 records at 30.15 inches; the 23d, 45 records at 29.80 inches; the 24th, 73 records at 29.85; and the 25th, 17 records at 29.86 inches. These give an average of exactly 30 inches, or the normal pressure; but it must be remembered that the great wave of the 22d began when the pressure was very high and took place on a falling barometer. It is probable that a large number of observations taken throughout the season would give from 29.93 to 29.95 as the average pressure at which most birds migrate.

The above study of the influence of atmospheric conditions upon migration pertains to a single week in March, when the first wave was passing over the Upper Mississippi Valley. A similar study will now be made for a week in May, just before the close of migration for the spring. The seven days from May 4 to May 10, 1884, have been chosen. This brief period includes two warm waves and an interim of indeterminate nature. Naturally, the birds were migrating under very different conditions, and, as a result, a very different set of birds was concerned. One may look in vain for notes on Ducks, Geese, Robins, and other early species. In their stead the brilliantly-colored Orioles, Grosbeaks, Indigos, and Tanagers will be found. In the place of the frost and cold of March, there is a summer temperature with frostless nights, and swarms of insects are ready for the Warblers, Vireos, and Flycatchers. But the laws of atmospheric movements remain unchanged, and their effect on the movements of birds is the same in kind, but slightly different in degree. A north wind still retards their movements, but it comes with no icy breath, and when the fancy takes them they move easily against its no longer dreaded force.

May 3, the record began at 11 p. m., at which time there was an area of low pressure in northeastern Dakota and Manitoba, the barometer being very low at Qu'Appelle (29.38 inches). Most of the Mississippi Valley was included between 29.7 inches and 30.0 inches, the latter being the reading all along our eastern border.

This low area produced southerly winds over most of the district, there being nothing but S., SE., and SW. winds in the region north of Saint Louis. The temperature was high (58° to 61°) along the Mississippi and the lower Missouri to Saint Paul and Omaha, falling to 55° at Saint Vincent and Bismarck, and falling rapidly around the lakes to 42° at Marquette. South of Milwaukee and Omaha the weather was cloudy; north of these places, clear. During the night the low area moved south to a point a little below Bismarck, the south wind still blowing over the Mississippi Valley, with increased cloudiness in the northern part. By 3 p. m. May 4, West Las Animas, Colo., was the center of the low area, and there was a decided fall in pressure over all the United States east of the Rocky mountains, causing the south wind to blow still harder, with clouds and local rains in the Upper Mississippi Valley. Such was the preparation for the bird wave of the night of May 4, for after 3 p. m. the low area turned northeastward and passed directly across the upper part of the district, being central at Yankton at 11 p. m., with a pressure of 29.64 inches. Thus all the migration during the nights of May 3 and 4 was on a falling barometer—on the night of the 4th with cloudiness, and on both nights with warm southerly winds.

In the study of migration in May, one must deal almost entirely with the 11 p. m. weather observations, for towards the latter end of migration the movement is for the most part by night. It is true that a few birds, the Warblers for instance, move a little during the daytime, passing slowly from tree to tree; but short distances only are made in these journeyings, leaving the bulk of the movement to be performed at night.

During the night of May 3 but few movements took place, and more than half of these were around Saint Paul and to the northward, where the influence of the low area in Manitoba was already beginning to be felt. The full advance was postponed until the next night, which was one of great movement over most if not all of the country between Saint Louis and Manitoba. The districts which furnished but nine records for the night of May 3, on the next night showed nearly seventy. The wave seems to have been most pronounced in Iowa, northern Illinois, southern Wisconsin, and at Saint Louis, with a heavy wave in Manitoba and another in northern Texas; but it is not unlikely that this seeming volume was due in part to the greater number of observers, for in each district the number of records of this wave was about proportionate to the number and excellence of the observers. It seems probable that to the northeastward the limit of the wave was at Madison, Wis., and thence up the Mississippi to Saint Paul. There is a striking similarity in the species which were reported from the stations between Saint Paul and Saint Louis, but while the northern stations reported the first males, Saint Louis reported the first females and bulk. Nearly one-half of the record is made up of notes on the Baltimore Oriole, Orchard Oriole, Rose-breasted Grosbeak, Indigo Bunting, Bobolink, Catbird, and Redheaded Woodpecker. No less than twelve records of the Baltimore Oriole were sent from six different States. These species would now be looked for in vain in the notes from Manitoba. A great bird wave was felt there, it is true, but the species composing it were totally different, being those, like the Yellow-rumped Warbler and White-crowned Sparrow, which passed through the central district some weeks before. As in the great wave studied in March, about half as many notes were reported the day after the wave had passed (in this case May 6), but these notes came from the same places as the day before, and were in ones and twos, indicating that they treated of species which arrived the day before but escaped notice. The only exception to this was in northeastern Wisconsin, where the notes indicated a large local wave; but, even here, it seems more likely that the observer was unable to be in the field May 5, and consequently did not see the arrivals until the next day.

The period described above was followed by a north wind. The low area had passed east of the Mississippi Valley, and was followed by colder and at the same time cloudier weather. During May 7 and 8 there was not a record of the whole eighty with a S., SE., or SW. wind. But the birds did not stop. There seems to have been a regular though not rapid advance, for on the night of May 6 there were thirty-six records, every one with N. or NW. wind and cloudy sky. Had this state of things lasted but a single night, one might be inclined to regard the records as mistakes on the part of the observers, but the whole eighty records for the two nights can not be wrong, and the inference is that during the latter part of migration there is no night so unfavorable but that some migration takes place.

The least movement of the seven nights under consideration took place on the night previous to May 9. A low area had developed two days before in Manitoba and had passed across Lake Superior, becoming central at Port Huron May 8, at 11 p. m. It had produced a great rise of temperature (5° to 11°) in the Upper Mississippi Valley—so much so as to make this section actually warmer than the middle portion. At La Crosse the thermometer registered 70°; at Saint Louis, 65°; Omaha, 69°; Little Rock, 66°; Bismarck, 55°; Fort Elliott, 53°; but the area extended so far north that the south wind it caused was of too short duration to start migration. The notes received came from places where the southerly winds were felt, principally in northeastern Illinois, with the single exception of a batch of records from central Iowa, where a northwest wind prevailed. The weather over the whole of the district was clear, with an average barometric pressure of about 30 inches.

In western Nebraska and eastern Colorado the barometer, though high, was falling, and during the daytime of May 9 it fell rapidly. At Yankton, during the sixteen hours previous to 11 p. m., May 9, the pressure fell .34 inch to 29.74 inches. Thus the low area developed right in the Mississippi Valley, and its influence was speedily felt, bringing on southerly winds and sending northward almost the last great wave of the spring migration. The temperature did not vary much from that of the night before, except to rise a little in the immediate vicinity of the low area and to fall at La Crosse and northeastward; the sky was mostly clear; the wind variable—the low area not having had time to fully affect the winds. All the records came from places where the winds were southerly—consequently from the cloudy places—so that although the larger part of the Upper Mississippi region was clear, the cloudy records form 73 per cent. of the whole number. Another thing was noticeable, namely, that notwithstanding the fact that the sky was cloudy, yet the dew point was many degrees below the temperature, showing that the air was very dry. The average of the difference between the temperature and dew point of the records of May 5 is only four degrees, with a range from 0° to 8°, showing that the air was almost fully saturated with moisture. The records of May 11 show an average difference of fifteen degrees, with a range from 11° to 33°. Thus it will be seen that the humidity of the atmosphere has little or no effect on migration, and can be left out of future investigations.

This wave of the night of May 9, like the one of five days before, was very extended. Along the western shores of Lake Michigan, where the weather had been cold and disagreeable for the four days previous, it was most strongly felt. Then little or no movement was noted until the Mississippi was crossed. Here, from Keokuk to Moorhead, the night was marked by great activity, and the movement extended in a southwesterly direction as far as southern Nebraska and Kansas. No notes were sent from southern Dakota, and it is probable that almost no migration took place in that Territory, as certainly none did in Manitoba. Nor was the movement of special importance south of Keokuk. The influence of the low area had not yet extended south of that point, and it was not until the next night that a full bird wave occurred at Saint Louis. The above is an excellent example of a bird wave and a warm wave both working from the north southward.

Recapitulating, in the same manner as was done for the March notes, it is found that the temperatures at which migration was made are as follows: At 46° there were 29 records of firsts; at 52°, 11 records; 55°, 116 records; 59°, 66 records; 63°, 70 records; 67°, 9 records. Thus, instead of a favorite temperature ranging from 37° to 41°, as was the case in March, it is found that from 55° to 60° is the favorite temperature for nearly the last wave. Indeed, 63° is about the average temperature at which the real rear guard, composed of Cuckoos, Whippoorwills, etc., usually moves.

In cloudy weather there were 184 records, and in clear weather 113; or 62 per cent. in cloudy to 38 per cent. in clear weather, as against 60 and 40 per cent., respectively, in March. The records with relation to the wind are as follows: Wind N., 64 records; NE., 0; E., 6; SE., 47; S., 49; SW., 42; W., 23; NW., 33; or for N., NE., and NW., 97; with 138 for S., SE., and SW.

The average barometer for 298 records was 29.88 inches, against 30 inches in March.

A STUDY OF THE "BIRD WAVES" WHICH PASSED UP THE MISSISSIPPI VALLEY DURING THE SPRING OF 1884.

The following study, for obvious reasons, must be considered as an experiment, known to be incomplete, and wanting in many essential details. The project was not thought of until migration had commenced; no instructions were issued to observers to note bird waves; only a few sent in any specific notes on the subject, and most of the information relating to it had to be picked out of a mass of notes not pertaining to the question, and so intimately connected with other themes as to be difficult of separation. Under such adverse conditions no attempt would have been made to study the bird waves were it not for the extreme importance of the subject. It is during the nights of bird waves that the bulk of migration takes place. This is especially true of fall migration, though to a large extent of spring also. To study migration successfully it must be studied when most active. Moreover, it is on bird waves that the action of the weather is most apparent; hence, these waves furnish the readiest means of studying the relation between meteorology and migration. The greatest drawback is met with in the difficulty of accurately observing and reporting bird waves. It is by far the hardest part of the field work in the study of migration, and requires more time and more constant presence in the field than most observers can give.

The only station at which the successive bird waves were accurately and fully noted was that at Saint Louis, Mo, where Mr. Otto Widmann, the most careful, competent, and painstaking observer in the district, spent nearly the whole time in the field. For the present, then, all that can be done is to take the bird waves of Saint Louis as a text and see how far they extended, and how the movements of birds at other places agreed with them. From the absence of material, it will be impossible to study all the waves of the Mississippi Valley. Those observed at Saint Louis will be given in full, not only to serve as a basis of comparison, but also to serve as a model for observers in future years.

The expression "*bird wave*" has been used many times. The term is capable of two interpretations; consequently, two methods of study are possible.

(1) A "bird wave" may be considered to consist of a very large number of individuals, of one or many species, which suddenly invade a certain area. In studying such a wave it is necessary to ascertain the species of which it is composed and the boundaries of the area over which it extends.

(2) Certain species, known to be migrating in company on a given day, may be considered to constitute a "wave," and their progress may be watched from day to day and from week to week.

This latter mode of study is applicable to the earliest waves only, for it is only early in the season, if at all, that the same species which are together in the south keep together during the entire journey. In all the later waves the species migrating in company change from day to day. Hence no attempt will be made to follow waves of this character; and the first, or bird waves proper, will alone be dealt with.

It is usually believed that all birds reach their winter quarters by the end of December, but in this respect the winter of 1883–'84 was exceptional. The fall of 1883 was very warm, and from latitude 39° southward there was no cold weather before Christmas. About this time, however, the real winter set in, and by January 2 it had extended southward to latitude 33°. Hence, fall migration did not end until the first week in January; and since spring migration began in central Mississippi on January 11, but little time was left between the end of the southward and beginning of the northward movement. It is to be observed, however, that the southward movement of January 1 was confined chiefly to the Thrush and Sparrow families, while the northward movement consisted wholly of water-birds. As examples of this late staying of birds at the north the following may be selected: Dr. G. S. Agersborg reported from Vermillion, Dak. (latitude 42° 56′), that "in early January birds were few, probably owing to previous mild weather. On January 5 winter set in, with the thermometer at 34½° below zero, and by the end of the month all our winter residents were here except the Bohemian Waxwing, the Evening Grosbeak, and the Magpie. Purple Grakles and Cowbirds did not leave until December 26, a later date by twenty-seven days than any noted since 1867, when I commenced to record arrivals and departures."

At Saint Louis, Mo. (lat. 38° 40′), the cold spell set in with a snowstorm January 1, causing most of the Bluebirds, Shrikes, Red-tailed Hawks, Red-shouldered Hawks, and Gulls to retreat southward, and bringing down large numbers of Crows.

From Anna, Ill. (lat. 37° 30′), C. W. Butler reported: "Until January 2, I could pick strawberry blossoms growing out of doors and uncovered; and all our winter residents were here in great numbers. But January 2 a heavy storm set in, and on the 4th the mercury was —21°, the coldest day for twenty years. Ducks and a great majority of our winter birds left and stayed away during the cold spell, which lasted through January." Still farther south, H. Nehrling, from Pierce City, Mo. (lat. 36° 56′), reported that "Harris's Sparrow, the Fox Sparrow, the Song Sparrow, and Towhee, after being common in the early winter, all left about January 1." At Caddo, Ind. Ter. (lat. 34° 11′), the children were barefoot on Christmas Day, and the woods were full of birds and bird song; after the cold spell of January 2 the woods were found still and almost tenantless.

First wave of 1884.—Turning now to northward movements, it is found that the first spring wave occurred at Saint Louis (lat. 38° 40′), in the latter part of January. Its record is as follows: January 25, a warm wave set in which continued until February 5; the warmest day (maximum 67°) was January 30. During this time the creeks were free from ice after the 29th, and the ice broke up in the Mississippi. The first wave brought the advance guard of Robins (*Merula migratoria*), Red-winged Blackbirds (*Agelaius phœniceus*), Purple Grackles (*Quiscalus quiscula*), Mallards (*Anas boschas*), Sprig-tails (*Dafila acuta*), and Canada Geese (*Branta canadensis*). The Bluebirds (*Sialia sialis*), Shrikes (*Lanius ludovicianus*), Red-tailed Hawks (*Buteo borealis*), Red-shouldered Hawks (*Buteo lineatus*), and Gulls (*Larus argentatus smithsonianus*), which had left during the coldest term, returned. Many Gulls passed, going north, and the vast multitude of Crows (*Corvus americanus*), whose numbers had swelled to something near 50,000 during the first half of January, decreased rapidly after the 26th.

This being the state of affairs at Saint Louis, it remains to determine the boundaries of the wave. As would naturally be expected, a large stretch of country south of Saint Louis was affected. In the extreme south, in Mississippi, the same wave of warm weather was found, but since water-fowl and other birds had been passing and repassing all the month no special effect on migration was noted. On reaching southern Illinois a state of things exactly similar to that at Saint Louis was found. Thus at Anna, Ill. (lat. 37° 30′), the "Ducks, which had left January 2, began to return and remained off and on during February, which was variable, raining and freezing alternately" (C. W. Butler). West of Anna, at Pierce City, Mo. (lat. 36° 56′), on January 30 and 31, the Robins and Bluebirds, which had been sent south by the cold of January 2, returned; and large flocks of Red-winged Blackbirds passed north, followed a day or two afterward by large flocks of Canada Geese, Brant, Snow Geese, Mallards, Pintails, and Teal. Even as far southwest as Caddo, Ind. Ter. (lat. 34° 11′), the same wave was felt. It began there January 24, but was not decidedly felt until the 28th. It entirely obliterated all signs of winter and started the first spring migration. Ducks and Geese moved a little, and most of the birds deserted their thick winter coverts, appearing in town and on the prairie, while all the songsters burst forth in full spring melody. Blackbirds, both Red-winged and Cowbirds, increased decidedly; grass started everywhere, and one wild flower was found.

Directly east of Saint Louis the wave can be traced to Odin, Ill. (lat. 38° 39′), where the atmosphere was warm from January 27 to February 4. The snow had all gone, and Geese appeared January 31, followed by Ducks February 2. West of Saint Louis the migration of Bluebirds was observed at Mount Carmel, Mo. (lat. 38° 45′), and of Robins and Geese at Glasgow, Mo. (lat. 39° 14′).

Above are the limits of this wave, which, although of great extent to the south, east, and west of Saint Louis, proceeded no farther north. A study of the Signal Service report shows the reason for this. Although the warm wave was felt for several hundred miles north of Saint Louis, yet its power was not sufficient to produce any marked thaw or breaking up of the streams. Indeed, even in the latitude of Saint Louis, no marked effect was observed, except in the lowlands. Stations in the vicinity of Saint Louis, and only 30 or 40 miles farther north, did not feel its influence. And the same is true in the West. In Kansas there was no movement of birds. At Manhattan (lat. 39° 12′), though in the same latitude, there was no migration, and the Signal Service reports show that the nights were cold, and winter reigned until a month later. An apparently accidental movement was reported from Unadilla, Nebr. (lat. 40° 53′, F. C. Kenyon), where Geese arrived January 31, and Ducks February 2; but it is possible that these birds were driven back from the north, as both Ducks and Geese had been reported January 11 from Vermillion, Dak. (lat. 42° 56′)—a locality where they had never before been seen in winter. A single record of Robins and Bluebirds came from Carlinville, Ill. (lat. 39° 19′), February 2, with the statement that no others were seen for two weeks (Chas. W. Robertson).

Second wave.—The second wave began at Saint Louis during the night of February 18, and was cut short on the 19th at 11.30 a. m. by a fierce snow-storm from the northwest. On the 18th, in the afternoon, the temperature rose rapidly with a good breeze from the southeast which moderated in the evening, but the temperature remained at 50° all night. The sky was clear in the evening, but cloudy in the morning. This wave brought more Robins, Bluebirds, and Purple Finches; many Mallards, Sprigtails, Green-winged Teal, and Canada Geese; it took off about half the Tree Sparrows (*Spizella monticola*), and brought the first migrants of the Goldfinch (*Spinus tristis*), White-crowned and White-throated Sparrows (*Zonotrichia leucophrys* and *albicollis*), Field Sparrows (*Spizella pusilla*), Song Sparrows (*Melospiza fasciata*), Swamp Sparrows (*Melospiza palustris*), Fox Sparrows (*Passerella iliaca*), and Chewinks (*Pipilo erythrophthalmus*). It appears to have been a local wave. No other stations reported any movement whatever on those dates. There were, to be sure, a few records of apparently irregular occurrences; a single Bluebird was seen at Newton, Iowa (lat. 41° 42′), but none afterwards for three weeks; a few Canada Geese were reported at Osceola, Ill. (lat. 41° 15′), February 20, and a few Ducks and Geese at Linwood, Nebr. (lat. 41° 22′), between February 20 and 25. The weather reports show that this warm wave was felt even beyond latitude 41°, but such cold weather had preceded it that it could not break the bands of winter and produce a condition of affairs that should invite birds to further migration.

Third wave.—A sudden rise of temperature at Saint Louis on February 25 and 26, again started the migrating hosts northward. There was not much of a "bird wave," but great movements of Geese took place on the first day, and of Ducks on the second. Red-winged Blackbirds and Robins increased, and the first Snow Geese appeared, together with the first Turkey Buzzard, Sparrow Hawk, Rusty Grackle, and Ruddy Duck. The first frogs and mosquitoes were noted.

Although the Signal Service reports show that this warm wave was quite extended and powerful, yet it was of too short duration to cause much movement among birds. The scouts of some of the hardier species moved a little farther northward, keeping mostly along the larger rivers. Robins and Bluebirds advanced up the Mississippi river to Quincy, Ill. (lat. 39° 55′); Bluebirds and Canada Geese were seen at Richmond, Iowa (lat. 41° 26′), while large flocks of Robins and Bluebirds appeared at Hillsborough, Ill. (lat. 39° 12′), and also at Griggsville, Ill. (lat. 39° 43′).

Until March 1 winter reigned supreme over all the land north of latitude 40°, and from February 27 to March 9 its icy fingers again closed around Saint Louis, driving all the Ducks south on March 2, and bringing on a "second winter."

The next period has been marked "Indeterminate" in the record. It is neither a stand-still nor a period of much movement. It extends from March 9, when the "second winter" was brought to a close by a south wind, to March 16. During this time there was a continual though slight northward movement at Saint Louis, and much movement in the region just north of it; and, what was of more importance, a general advance in the line of open water, inviting a forward march and preparing the way for the immense movements of the following week. At Saint Louis the arrivals were as follows:

March 9 the first Ducks returned and passed north, followed two days later by large flocks of Red-winged Blackbirds (both male and female), Purple and Rusty Grackles, and the first individuals of the Killdeer (*Ægialitis vocifera*), Meadowlark (*Sturnella*), and Flicker (*Colaptes*). On March 12 came the first Snipe (*Gallinago*), and on the 16th the first Cranes (*Grus mexicana*).

Thus, there was little change in the species present at Saint Louis, but a great increase in the number of individuals. This increase was less apparent at Saint Louis than at more northern points. The hosts of birds sent south by the inclement weather did not halt, on their return, at their former resting places, but pushed rapidly forward and spread over many miles of new country. The onward movement dates from about March 12, and during the remainder of the "indeterminate" period (that is, to March 16) Ducks, Geese, Robins, Bluebirds, Blackbirds, Meadowlarks, and Killdeer were found over all of northern Illinois and the southern edge of Wisconsin, all of Iowa and eastern Nebraska, while a few scouts, keeping close to the Mississippi river, followed it nearly to Saint Paul. The general dispersion of the birds at this time can be seen from the fact that seventy-two records of the arrival of Ducks, Geese, Robins, and Blackbirds were received from the region indicated.

Fourth wave.—At Saint Louis the first rain of the season occurred March 17, after a warm night (thermometer 56°), with a light south wind. Winter ended, and spring began with a sudden start of vegetation and an awakening of insect life. Many birds arrived during the night, and others were moving all the morning. The bulk arrived of the Robin, Flicker, Meadowlark, Bluebird, Chewink, Purple Grackle, Rusty Grackle, Red-winged Blackbird, Song Sparrow, and Blue-winged Teal. There was an increase of Wilson's Snipe, White-crowned, White-throated, and Field Sparrows. The first arrivals appeared of the Phœbe (*Sayornis phœbe*), Pectoral Sandpiper (*Tringa maculata*), Cowbird (*Molothrus ater*), Field Plover (*Bartramia longicauda*), and the Little Yellow Rail (*Porzana noveboracensis*), while the bulk of the Tree Sparrows (*Spizella monticola*) departed.

Since the movement in this wave consisted principally in an increase of those species which had already come in the preceding waves, and since few of the stations reported more than the first arrival, it is practically impossible to work up the wave from the notes in hand. There seem to be intimations that the power of the wave was not great, but that its influence was felt more or less for a hundred miles north of Saint Louis and for a great distance west and southwest.

Fifth wave.—March 22; this was next to the largest wave of the season. The night before was warm (thermometer 53°) and cloudy, with a light southeast wind. The day was cloudy and threatening, with an increasing southeast wind. Many birds arrived during the night and others were moving all the forenoon. The following birds attained the height of the season—that is, the period of greatest abundance: Robin, Flicker, male Red-winged Blackbird, Purple and Rusty Grackles, Chewink, transient Bluebirds, transient Purple Finches, and Song Sparrows. The bulk arrived of the Shrike, Phœbe, and Wilson's Snipe; and an increase was noted in the White-throated, Field, and Swamp Sparrows, male Cowbirds, and Red headed Woodpeckers. The first appeared of the Chippy (*Spizella socialis*), Brown Thrush (*Harporhynchus rufus*), Bewick's Wren (*Thryothorus bewickii*), Grass Finch (*Poo-*

cœtes gramineus), Savanna Sparrow (*Ammodramus sandwichensis savanna*), and the Mourning Dove (*Zenaidura macroura*). There was also great movement among the Hawks and Ducks, and among the Waders of the genus *Totanus.* To appreciate the full effect of this wave, observations must extend over nearly the whole of the Mississippi Valley north of Saint Louis. The warm wave was felt almost to British America, and everywhere it started the birds northward. Owing to lack of notes the movements in the immediate vicinity of Saint Louis cannot be followed. The few stations in that section that have furnished reports made no mention of any special movement and noticed but few arrivals, the principal one being that of the Brown Thrush. To the northward, however, the case was very different. The warm weather reached Iowa the following day (March 23) and the general character of the reports from Iowa and southern Wisconsin is well expressed by the following remarks from the observer at Waukon, Iowa (lat. 43° 15′):

"We had a pleasant fall, and a severe winter until the middle of March. Since then it has been mild and pleasant until about April 1. Spring really began about March 23, and the first wave of birds came then. That was the greatest day for migration of birds I ever saw. The bulk of Robins, Bluebirds, Ducks, and Geese came, and hundreds of Blackbirds came also." (E. M. HANCOCK.)

Between Waukon and Saint Louis most of the reports mention arrivals which agree very closely with the birds of the fourth wave at Saint Louis. There is not enough uniformity in these reports, however, to indicate with positiveness that the birds of the fourth wave spread over this section during the night of March 22, but there is a general tendency in this direction, so that it may be said that the arrivals reported March 23 over much of Iowa and southern Wisconsin were such as would have been noted had the fourth wave passed over during the previous night. The principal exceptions occurred along the courses of the larger rivers, where the arrivals were somewhat earlier (that is, about March 20). North of Waukon the movements of the first wave only were recorded. In favored localities the effects began to be noticed March 23, but in the majority of cases the following day witnessed the great advance. The results of this wave are easily traced to latitude 45°, and in the neighborhood of the Mississippi and Missouri rivers to latitude 46°. Some idea of the magnitude of the flight of birds which took place March 23 may be had from the report from Heron Lake, Minnesota (latitude 43° 48′), with which the report from Storm Lake, Iowa (latitude 42° 37′), agrees almost exactly. It was the first wave of real migration, and brought Mallards, Pintails, Gadwalls, Widgeons, Big and Little Scaups, Golden-eyes, Red-heads, Canvas-backs, Butter-balls, Green-winged Teal, Hooded and American Sheldrakes, Spoon-billed Ducks or Shovellers, Brant, Herring Gulls, Coots, Killdeer Plovers, Ravens, large numbers of Blackbirds, and one Meadowlark. Most of the species appeared in great numbers and some of the Ducks in clouds. Most of the Ducks came from the west, being probably a part of the Missouri valley flight. By way of comparison, to show how little can be judged of the migration at one place by that of another, let us examine the state of affairs at Manhattan, Kans. (directly west of Saint Louis), in latitude 39° 12′. Here, during the first week of March, no arrivals were noticed. March 8 the first birds came, namely, Geese and Ducks—Mallards, Canvas-backs, Red-heads, and Green-winged Teal were particularly abundant. The first Killdeer were seen on the 11th; two more on the 13th, at which date Meadowlarks appeared. It seemed as if spring had really come, but on March 13 a polar wave arrived and all was changed. The fifth wave was not felt here in the least, the weather being cold and snowy. To the southwest still another condition of things existed. At Caddo, Ind. Ter. (lat. 34° 11′), on March 22, the weather was hot and dry, with continuous south winds, more like summer than spring. Fewer birds were present than at any time since February 1. The commonest species was the Savanna Sparrow. There were no Juncos, Tree Sparrows, White-throated Sparrows, White-crowned Sparrows, Harris's Sparrows; Cowbirds, Red-winged Blackbirds, Meadowlarks, Ducks, or Geese. A few individuals of each of these species may still have lingered, but the bulk left some days previously, and none were seen on the 22d. There was very little vegetation, owing to lack of rain.

The study of this fifth wave leads naturally to the following statements concerning bird waves in general: The movements of bird waves are governed by those of atmospheric waves. Since a warm wave takes several days to pass from one end of the Mississippi Valley to the other, it must not be supposed that the whole of a bird wave is included in a single night. In the case of small waves, which are almost local in character, the whole effect may be felt in one night; but waves ordinarily occupy the whole of two days, and often three or four. It must not be supposed that a bird wave consists of the same species of birds at all places where its effects are felt. Above, when speaking of the birds of the fourth wave, the species which were moving at Saint Louis at this time were alone referred to. The ducks which arrived at Heron Lake, Minnesota, March 24, were as truly a part of the "fifth wave" as the Brown Thrushes and Bewick's Wrens which came to Saint Louis on the 22d. For further remarks concerning bird waves the reader is referred to the article on the Kingbird in the systematic portion of this report.

For the instruction of observers, a copy of the "synopsis" of spring migration (in 1884) at Saint Louis, furnished by Mr. Widmann, is subjoined. During the migration season Mr. Widmann sent reports every few days, but in this synopsis he has presented the substance of the same in condensed form and in such a graphic manner that the more important movements of the bird waves can be seen at a glance, together with their relation to the lesser movements of migration. It is greatly to be desired that at the close of the season each observer should supplement his regular reports with a synopsis of this sort. In the synopsis the following abbreviations have been used: F.=the first individual seen; B. A.=the arrival of the bulk; B. D.=the departure of the bulk; L.=the last individual seen; H.=the height of the season, or the period when the species is most abundant; T. V.=transient visitants. Thus when "B. A. Catbird T. V." is spoken of, it means the arrival of the bulk of Catbirds which do not intend to remain to nest, but are passing through to their more northerly breeding grounds.

Synopsis of Migration at Saint Louis from January 1 *to May* 27, 1884.

By OTTO WIDMANN.

Jan. 1.	Snow storm.		
2.			
3.			
4.			
5.	Coldest period; minimum temperature—21° Fahr. on the 5th.		Mississippi full of floating ice.
6.			
7.			
8.			
9.			
10.			
11.		Ground covered with snow.	
12.			
13.			
14.			Mississippi gorged.
15.			
16.			
17.			
18.	Moderately cold.		
19.			
20.			
21.			
22.	Ther. 56°; snow disappeared; first flock of Geese seen.		Mississippi entirely frozen.
23.	Snow Buntings gone.		
24.			
25.	Crows begin to disperse.		
26.			
27.			
28.			
29.	Warm wave. Gulls return.		
30.	Ther. 67°. First Ducks (Mallards and Sprigtails) and the first Robins and Red-winged Blackbirds go north; Gulls go north in migrating wedge; Bluebirds and Shrikes begin to return.		Creeks free from ice; ice in the Mississippi breaking.
31.			
Feb. 1.			
2.	First Purple Grackle; Canada Geese go north; Red-tailed Hawks at stand.		
3.	75-85 Herring Gulls go north.		
4.	First green shows itself on the ground.		
5.	Large flocks of Ducks go north.		
6.			
7.			
8.			
9.			
10.	Cold, dark, damp weather, with rain and snow.		
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.	South wind. Birds move; flocks of Geese go north; also Mallards, Sprigtails, and Green-winged Teal.		
19.	Increase of Bluebirds, Goldfinches, and Black-capped Chickadees (T. V.).		
20.	First Fox Sparrow, Chewink, White-throated, White-crowned, and Field Sparrows.		
21.	First Robin at stand. Decrease of old Purple Finches.		
22.	Ducks and Geese in many flocks go north.		
23.	Cold winds. Robins in flocks. Bald-headed Eagle, Song, and Swamp Sparrow.		
24.	Tree Sparrows have decreased at stands, but are found in large migrating flocks in the lowlands.		
25.	Ther. 58°. A great day for wandering Geese. First Snow Goose. Sudden rise.		
26.	Ther. 56°. Great day for wandering Ducks. First Turkey Buzzard, Sparrow Hawk, Rusty Blackbird, and Ruddy Duck; increase of Red-winged Blackbirds and Robins. First frogs and mosquitoes.		

Feb. 27. Ther. 19°.
28. Ther. 7°. } Ground bare; Ducks remain in marshes.
29. Slight rise.
Mar. 1. Falling temperature; snow-storm.
2. Cold; snowing again. Ducks go south.
3.
4. } Second winter.
5. Cold northerly winds, dark, gloomy skies.
6. Sleet; ground covered; watersheets frozen hard, and the Mississippi full of floating ice.
7.
8.
9. Thawing begins; first Ducks go north again.
10. General thaw; wind high, southeast. Ducks go north.
11. Falling temperature after a warm night. Great numbers of Ducks on the marshes. First large flocks of Purple Grackles, Red-winged Blackbirds (both male and female), and Rusty Blackbirds; first Killdeer and Meadowlark; a large flock of Robins with Flickers.
12. Cold west wind.
13. Wind southeast. Ducks move. First Wilson's Snipe; first song of Robin, Chewink, and Song Sparrow. The Black Snowbirds (Junco), Purple Finches, and Tree Sparrows are excited; Swamp Sparrows increased.
14. Cold north wind.
15. Rising temperature, followed by a mild, clear night with light wind southeast, but no arrivals. Temperature at Saint Louis, 54°; at Cairo, 47°; wind north.
16. Wind southeast. Geese and Ducks are on the move. First Cranes.
17. First rain of the season, after a warm night. Ther. 56°; wind light, south. Winter ends, and spring begins with a sudden start of vegetation and awakening of insect life. Birds have arrived during the night and others were moving all the morning. Bulk arrive of Robin, Flicker, Meadowlark, Bluebird, Chewink, Purple Grackle, Rusty Blackbird, Red-winged Blackbird, Song Sparrow, and Blue-winged Teal. An increase of Wilson's Snipe, White-crowned Sparrow, White-throated Sparrow, and Field Sparrow. First Phœbe, Pectoral Sandpiper, Cowbird, Upland Plover, and Little Yellow Rail.
Bulk departure of Tree Sparrow.
18. Rain; wind east. Frogs noisy; turtles on logs.
19. Rain; wind west to northwest. Vegetation progressing rapidly. Cranes go north.
20. Cool; wind northwest to north. Elms and maples open blossoms. Geese go north.
21. Rising temperature; wind northwest to east. First Swan.
22. Night: warm; thermometer 53°; cloudy; wind light, southeast.
Day: cloudy, threatening; increased southeast wind.

GRAND BIRD WAVE.

Many birds arrived during the night, and others were on the move all the forenoon.
H. Robins, Flickers, Red-winged Blackbirds (males), Purple Grackles, Rusty Blackbirds, Chewinks, Bluebirds (T. V.), Purple Finches (T. V.), and Song Sparrows.
B. A. Shrikes, Phœbe, and Wilson's Snipe.
Increased: White-throated Sparrow, Field Sparrow, Swamp Sparrow, Cowbird (male), and Red-headed Woodpecker.
F. Brown Thrasher, Chippy, Bewick's Wren, Grass Finch, Savanna Sparrow, Mourning Dove.
Great movement of Hawks, Ducks, and Yellow-legs.
23. Cool; wind northwest, clear. First songs of Brown Thrush, Chippy, and White-throated Sparrow.
Mating and song of Chewink, Robin, Bluebird, Shrike, Cardinal Grosbeak, Carolina Wren, Tufted Titmouse, Junco, Purple Finch, Fox Sparrow, Song Sparrow, Field Sparrow. Tree Sparrows are scarce. English Sparrow lays first eggs.
First bat seen; winged insects appear; also ants and worms.
24. Rain all the morning. P. M. clearing; wind shifting to southwest and northwest. Birds do not move until 5 p. m., when Ducks and Blackbirds go north.
F. White-bellied Swallows go north at 5.30 p. m.
F. Purple Martin in sight at 5.45 p. m.
25. Sultry, with showers and hailstones; wind south, turning to west, high during the afternoon. No arrivals except Martins.
B. D. White-throated Sparrow (old), Rusty Blackbird, Mallard, Sprigtail, Baldpate.
Decreased: Robins, Flickers, and Blackbirds.
Numbers of Hawks go straight north. (Bald-headed Eagle, Marsh Hawk, Sparrow Hawk).
No Tree Sparrows seen to-day. F. Butterfly going north.
Early shrubs, such as *Ribes* and *Syringa*, put forth leaflets.
26. Beautiful day; wind west to northwest, abating; thermometer 60°, after a windy clearing up night. No arrivals.
27. Night: clear; wind light, south, warm; thermometer 58°. Birds move.
Day: wind increasing southeast.
B. D. Junco, Purple Finch, Fox Sparrow, Song Sparrow.
F. Winter Wren, Ruby-crowned Kinglet, Yellow-bellied Woodpecker, Golden-crowned Kinglet, Large-billed Water Thrush.
Increased: Chippy (male), Brown Thrasher, Brown Creeper.
F. Double-crested Cormorant.
28. Night: stormy.
Day: wind high, west to northwest.
29. Wind north.
30. Wind northeast shifting to southeast; calm. F. Female Purple Martins.
Swans, Cranes, Ducks, and Hawks go north.
31. Night: clear, warm; wind southeast, cloudy toward morning. Birds move.
Day: Cloudy, rainy, warm; wind southeast.
B. D. Robin, Flicker.
B. A. Chippy (male), Bewick's Wren, Chewink (T. V.), Brown Creeper, and the genera *Numenius*, *Rallus*, and *Porzana*.
Increased: Brown Thrush, Phœbe (T. V.), Cowbird (female).

Apr. 1. Night: Heavy rain; wind southeast. Day: Wind increasing, west, falling temperature.
F. Hermit Thrush.
2. Cold blast from northwest; gloomy.
3. Wind light, northwest; clear; cool night; hoar frost.
4. After a cool, frosty night, day clear, with light northwest wind.
F. White-browed Yellow-throated Warbler.
Decrease: Junco, Chewink (T. V.).
L. Fox Sparrow already gone.
B. A. Cowbird, Kingfisher, Double-crested Cormorant, Yellow-bellied Woodpecker.
5. Wind northeast; rain; cloudy.
6. Hazy; wind east. Vegetation progressing rapidly, especially grasses.
Flowering: *Populus*, *Salix*, *Magnolia*, *Viola*, *Trillium*.
Leafing: *Sambucus*, *Syringa*, *Lonicera*, *Melia*, *Larix*.
7. Cool; cloudy; high west and northwest wind.
8. Cool; cloudy; high west and northwest wind.
9. Cool; cloudy; high west and northwest wind.
10. Cool; cloudy; high west and northwest wind.
11. Cool; wind strong, east. Loons go north.
12. Rain; wind east to southeast.
13. Rising temperature; wind southeast. In afternoon birds begin to move. Ducks and Geese go north.
F. Chimney Swift, Pelican.
Increase: Purple Martin.
14. During night light thunder-storm and rain. Birds move.
Day: Sultry; thermometer 72°; wind south.
Departed: Winter Wren, Yellow-bellied Woodpecker.
L. Canada Goose; Snow Goose.
B. A. Brown Thrush, Chippy (T. V.), Hermit Thrush, Blue-gray Gnatcatcher, Ruby-crowned Kinglet.
Increase: Yellow-rumped Warbler, Chimney Swift, Mourning Dove, Purple Martin.
F. Cœrulean Warbler, Blue-yellow-backed Warbler, Mockingbird.
H. Cowbird, Double-crested Cormorant, Brown Creeper.
15. Night: Warm; wind light, southwest.
Day: Falling temperature; wind shifting to west and northwest.
F. Cliff Swallow, Rough-winged Swallow.
16. Cool; wind northwest, abating in evening.
17. Night: Clear, calm, with light east wind. Birds move.
A warm day; wind increasing, east.
F. Black and White Creeper, Redstart, White-eyed Vireo, Golden-crowned Thrush, Yellow-throated Vireo.
B. A. White-throated Sparrow (old ones in high plumage), White-crowned Sparrow, Yellow-rumped Warbler.
18. Night: Cloudy, rainy, calm. Birds move.
Day: Clearing, sultry; wind southeast, light.
F. Kingbird, Maryland Yellow-throat, Red-poll Warbler, Prothonotary Warbler.
H. White-throated Sparrow (old).
19. Night: Dark, misty, calm, warm. Birds move.
Day: Overcast, sultry; wind east, light, shifting in afternoon to north, with rain.
F. House Wren, Golden Warbler, Warbling Vireo, Wood Thrush.
H. Brown Thrush, Chippy, Yellow-rumped Warbler, Swamp Sparrow.
Increased: Golden-crowned Thrush, Blue Yellow-backed Warbler, Cœrulean Warbler, Savanna Sparrow, Chimney Swift, Mourning Dove.
B. D. Hermit Thrush, Robin (female).
L. Song Sparrow, Fox Sparrow.
Leafing: Maples, Elms, Poplars, Hickory. The ground in the woods is covered with flowers; Cherry and Pear trees in full bloom, and Apple buds ready to open.
20. Cold; wind north; dark, misty.
21. Cold; wind north; dark, misty, rainy.
22. Cold; wind north; dark, misty, rainy.
23. Cold; wind north; dark, misty. About a dozen strange Martins crowd into the boxes to-night. They seem to be refugees from the north, looking lean, and some are barely able to fly.
24. Cold; wind north; clearing. In afternoon rising temperature. The strange Martins return to boxes in the evening.
25. Night: Clear, calm, but cooling off to light hoar frost. Birds leave.
Day: Clear, calm; wind north, light.
No arrivals (except F. Catbird, one, and F. Lark Finch, one), but of departures many. The Martins from the north leave. B. D. Brown Thrush (T. V.), Chippy (T. V.), Yellow-rumped Warbler, White-throated Sparrow (old), Wilson's Snipe. A Yellow-bellied Woodpecker (male), which had put up at Laclede Park since the 19th, also disappeared.
26. Night: Warm, clear; thermometer 57°; wind east by south. Birds arrive.
Day: Fair; increasing south wind; thermometer 75°.
B. A. Lark Finch, White-eyed Vireo, Yellow-throated Vireo, Blue-gray Gnatcatcher (T. V.), Blue Yellow-backed Warbler (female), Golden-crowned Thrush (T. V.), Red-poll Warbler, Redstart, Cœrulean Warbler, Pine-creeping Warbler, Wood Thrush (male), Red-winged Blackbird (female), Kingbird (male and T. V.).
Increased: Maryland Yellow-throat (male), House Wren (male), Golden Warbler (male).
F. Olive-backed Thrush, Small-billed Water Thrush, Yellow-breasted Chat, Black-throated Bunting, Baltimore Oriole, Rose-breasted Grosbeak, Red-eyed Vireo, Black-throated Green Warbler.
B. D. Ruby-crowned Kinglet, Swamp Sparrow.
27. Night: Warm, thermometer 67°; threatening, with strong southeast wind.
Day: High wind from southwest; clearing. No change (except first flock of high-dress Goldfinches).
28. Night: Clear, becoming cloudy; wind light, west, shifting to northeast and southeast. Thermometer 60°. Birds move.
F. Orchard Oriole (male), Kentucky Warbler, Bell's Vireo, Indigo-bird (male), Maryland Yellow-throat (female).
B. A. Maryland Yellow-throat (male), Goldfinch (male), Baltimore Oriole (male), Rose-breasted Grosbeak (male), Kingbird, Summer Yellowbird (T. V.), House Wren.

Apr. 28. Increased: Black-throated Bunting (male), Cliff Swallow, Barn Swallow, Black-throated Green Warbler.
L. Hermit Thrush.
29. Night: Clear, becoming cloudy; wind light, southeast; temperature steady at 63°.
First hot day; maximum temperature 82° (77° at 6 p.m.). The bird wave struck fully. Incredible number of birds present.
B. A. Catbirds arrived in force (male, female, and T. V.); Black-throated Buntings (male) at stands, and small parties on the wing going east; Olive-backed Thrush and Small-billed Water Thrush in flocks; Goldfinch (female), Indigo-bird (male), Orchard Oriole (old males); Warbling Vireo, Black-throated Green Warbler, Yellow-breasted Chat, Red-eyed Vireo, Red-headed Woodpecker, Black and White Creeper, White-crowned Sparrow.
F. Scarlet Tanager, Wilson's Thrush, Nighthawk, Bobolink (male), Wood Pewee, Traill's Flycatcher, Acadian Flycatcher, Least Flycatcher, Tennessee Warbler, Nashville Warbler, Black-poll Warbler, Worm-eating Warbler, Blue-headed Vireo, Red-bellied Nuthatch, Great-crested Flycatcher, Lincoln's Sparrow, Bank Swallow, Black-crowned Night Heron. Apple trees in full bloom; oaks open flowers.

NOTE.—This enormous volume of bird life seems to have resulted from the combined operation of the following bird wave; the start began in the north, and the warm wave reached Saint Louis the night of the 24th, at which time many birds left, but none arrived. The same warm wave, progressing from the Rocky Mountains eastward, started from El Paso on the 22d, reached Fort Smith and Shreveport on the 24th, Little Rock on the 25th, and the birds which arrived in Saint Louis on the 26th came probably from the southwest. The cold wave hovered over Kentucky from the 20th to the 25th, and no movement can have taken place before that day; but when, on the night of the 28th, the bulk of birds from that quarter (southeast) reached Saint Louis it swelled the number of arrivals (from south and southwest) to this enormous height.

30. Another warm night; thermometer 70°; clear; wind light, south. Birds move.
Day: Hot; thermometer 83°; wind southeast to southwest. More birds left than arrived.
H. Yellow-breasted Chat (T. V.), White-crowned Sparrow, Black-throated Green Warbler, Savanna Sparrow, Red-headed Woodpecker, Goldfinch, White-eyed Vireo (T. V.), Cœrulean Warbler, Chimney Swift.
B. A. Kentucky Warbler, Great-crested Flycatcher, Hooded Warbler, Maryland Yellow-throat (female), Redstart (female).
Increased: Bobolink, Bell's Vireo, Indigo-bird (male), Black-throated Bunting (male), Acadian Flycatcher, Tennessee Warbler, Nashville Warbler, Black-poll Warbler.
F. Yellow-winged Sparrow, Orchard Oriole (two year old male).
L. Shoveller Duck.
May 1. Rain both night and day; clearing in afternoon, with strong west wind.
From May 1 to May 4, a stand-still.
2. Cool; wind northwest; clearing.
3. Cool; wind northeast; in afternoon southeast, with rising temperature.
4. Rain; rising temperature; wind south. Nighthawks move.
5. Night: clear; almost calm; wind southeast to south; warm; thermometer 63°. Birds move decidedly.
Day: Fair; becoming threatening; in afternoon a thunder-storm.
H. House Wren, Maryland Yellow-throat, Summer Yellowbird, Black-throated Bunting (male), Catbird, Chimney Swift.
B. Continued of Olive-backed Thrush, Small-billed Water Thrush, and White-crowned Sparrow.
B. A. Bank Swallow, Wood Thrush (female), Lincoln's Sparrow, Rose-breasted Grosbeak (female), Indigo-bird (male), Baltimore Oriole (female).
Increased: Wood Pewee, Traill's Flycatcher, Orchard Oriole (males two years old), Tennessee Warbler, Nashville Warbler.
F. Black-billed Cuckoo, Hummingbird, Black and Yellow Warbler, Pine-creeping Warbler, Blue-headed Vireo (female), Indigo-bird (female), Orchard Oriole (female), Baltimore Oriole (birds of last year), Blue Yellow-backed Warbler (T. V.), Solitary Sandpiper.
B. D. Goldfinch (T. V. males), Yellow-breasted Chat (T. V.), White-eyed Vireo (T. V.), Yellow-rumped Warbler (young).
L. Red-bellied Nuthatch, flock of Purple Finch (young), Red-poll Warbler.
6. Night: Partly clear; warm; temperature 62°; wind south to southeast.
New arrivals.
Day: Rainy, dark; wind shifting to west; falling temperature.
Many T. V. present.
F. Yellow-billed Cuckoo, Black-poll Warbler (female), Black-capped Flycatching Warbler, Chestnut-sided Warbler.
Increased: White-throated Sparrow (young).
B. A. Black-poll Warbler (male), Black and Yellow Warbler, Redstart (T. V.).
H. Rose-breasted Grosbeak, Orchard Oriole (male), Indigo-bird (male).
7. Night and day: Strong west wind; dark.
8. Night: Clear, fair, cool; wind west to northwest.
Day: Clear, beautiful; thermometer 72°; wind northwest. A great day for wandering Bobolinks.
B. D. Catbird (T. V.), Golden Warbler (T. V.), Goldfinch (female).
F. Yellow-bellied Flycatcher.
9. Night: clear, bright, full moon; wind northwest; thermometer 64°.
Day: Clear, bright, lovely; wind northwest.
H. Bobolink (male), Tennessee Warbler (male), Black-poll Warbler (male), Redstart (female).
B. A. Indigo-bird (female and young male), Orchard Oriole (female), Least Flycatcher, Black-throated Bunting (young males).
F. Orchard Oriole (one-year-old males).
10. Night: Clear, calm; wind northwest; warm; thermometer 69°.
Day: Fair; wind changing to southeast; rising temperature; thermometer 85°.
Full bloom: Oak, Hickory, Walnut.
Many T. V. Warblers.
F. Blue Golden-winged Warbler, Orange-crowned Warbler, Blue Yellow-backed Warbler (young).
B. A. Yellow-winged Sparrow, Cuckoo.
H. Chestnut-sided, Black and Yellow, Black-poll, Nashville and Tennessee Warblers.

May 10. L. Yellow-rumped and Black-throated Green Warblers, Blue-headed Vireo, Swamp Sparrow, Yellow-bellied Woodpecker (female).

11. Night: Clear, calm; wind northwest; warm, thermometer 69° to 64°; moonlight. Birds arrive.
Day: In forenoon bright, in afternoon overcast, rainy; wind north to northeast.
A great day for migration; oak woods full of T. V. birds going north all day. Mourning Doves present in great numbers; White-throated Sparrows (young) in large flocks, and the same of young Olive-backed Thrushes, Bobolinks, Red-winged Blackbirds (female), and Blue Jays in flocks going north; Double-crested Cormorants (young), two parties go north; Nighthawks at great heights; also Waders (species unknown) going north.
T. V. present of Wood Thrush, Warbling Vireo, Rose-breasted Grosbeak, Baltimore Oriole, Red-headed Woodpecker, Scarlet Tanager.
H. Wood Pewee, Traill's Flycatcher, Bell's Vireo.
F. Bay-breasted Warbler, Blackburnian Warbler, Canadian Flycatching Warbler, Summer Redbird (young).
B. A. Purple Martin (young), Redstart (young, one year old).

12. Night: Cloudy, calm; wind northeast; foggy. No arrivals, but decrease of many.
Day: Clearing; in afternoon thunder-storm.
B. D. Wood Thrush (T. V.), Olive-backed Thrush, White-throated Sparrow (young), White-crowned Sparrow, Mourning Dove (T. V.), Red-headed Woodpecker (T. V.), Yellow-breasted Chat (T. V.), Least Flycatcher.

13. Night: Threatening, calm; wind west; rainy.
Day: Falling temperature; cloudy; wind northwest. No new birds. T. V. getting scarce.
B. D. Black-poll, Chestnut-sided, Nashville, and Tennessee Warblers.

14. Cool; wind northwest.

15. Slowly rising temperature; wind west. Yesterday and to-day but few T. V. present.

16. Night: Clear, calm; wind southwest; thermometer 68°.
Day; bright; wind northeast.

17. Night: Clear, calm; wind southeast; thermometer 68°. In these two days birds move and the rear guard arrives.
B. A. Bobolink (female and young male), Alice's Thrush, Black-throated Bunting (female), Mockingbird (young), Barn Swallow (young).
L. Kingbird (T. V.), Traill's Flycatcher (T. V.), Mourning Dove (T. V.), Black and Yellow Warbler, Nashville Warbler, White-throated Sparrow, White-crowned Sparrow, Least Flycatcher, Black-capped Flycatching Warbler.

18. High south wind; thunder-storm.

19. Strong west wind; cool.

20. North wind. L. Lincoln's Sparrow, Bobolink.

21. South wind; clear, calm. F. Connecticut Warbler, Mourning Warbler. L. Tennessee Warbler, Wilson's Thrush, Canadian Flycatching Warbler.

22. South wind. L. Double-crested Cormorant, Solitary Tattler.

23. Wind southeast, shifting to northwest.

24. Wind northwest; cool.

25. Wind northwest; L. Alice's Thrush, Black-poll Warbler.

26. Wind northwest; L. Olived-backed Thrush.

27. North wind; L. Nighthawk (fourteen T. V. go north in the evening).

PROGRESS OF VEGETATION AND AWAKENING OF ANIMAL LIFE IN THE MISSISSIPPI VALLEY DURING THE SPRING OF 1884.

This subject will be treated from the south northward in steps or sections of two degrees each, beginning with latitude 28° and extending to latitude 53°, or over 25 degrees of latitude. Thus it will be seen that the observations cover a tract of country 1,750 miles in length. In studying each section the endeavor has been to make the dates indicate fair averages for the middle of the section. For example, in the section which extends from latitude 38° to latitude 40°, the dates are as exact as possible for latitude 39°. For the southern half they would then be a day or two earlier, and for the northern part somewhat later. It is also intended that the dates shall express average time; for instance, in the appearance of flowers, one observer, in a sunny and well protected nook, finds the "first flower" while the rest of the country is bleak and bare. Another does not consider it proper to record flowers as present until they can be found almost anywhere. In giving dates of flowering, an average has been taken of the several dates received, with a leaning toward the earlier. The same remark applies to the other dates treated in this chapter. The number of observers in the first five sections is so deplorably insufficient for the extent of the country that the dates must be considered as the merest approximations; for the next four sections they are quite full and accurate, while for the last two they are again insufficient. In studying the movements of any species of bird, reference to this part of the report will show with considerable accuracy the conditions under which it was migrating and the prospect for a plentiful food supply.

I. This section (extending from latitude 28° to latitude 30°) contains the extreme southern part of Louisiana and the middle part of southern Texas (the reports from Texas coming from the region of the Rio Grande). In Louisiana, in the spring of 1884, the earliest leaves began to show on briar bushes and willows the first week in February, followed the next week by grass and flowers. This is of course a moist country, while in southern Texas the climatic conditions are different. Vegetation there was much later in starting, owing to the lack of rain. The first rain after September fell March 6, and was followed immediately by the blooming of myriads of plants and the rapid development of leaves previously in bud. Frogs in this part of Texas had but a short winter vacation, being heard both in January and February; while the first in Louisiana was reported March 13, but they must have croaked some time before. The bulk of the insects appeared in both places at the same time, namely, the middle of March. There was no frost in this part of Texas, and in Louisiana the last "freeze" occurred February 15. In Louisiana the first snakes were not reported. In Texas the first rattlesnakes were seen March 16, and other snakes much earlier. The first bat was recorded February 27.*

II. This section (from latitude 30° to latitude 32°) consists of the southern part of Mississippi, central Louisiana, and central Texas. No reports were received from Louisiana, and Mississippi sent but few. In Texas the last frost was recorded February 27, followed, March 3, by the first rain. As in the more southern part of Texas, the first rain immediately started the grass, leaves, and flowers, and by April 1 flowers were in the height of bloom. In Mississippi flowers were plentiful March 25. Rattlesnakes appeared in Texas March 29; and the first snake of the harmless sorts was seen in Mississippi February 11, which is rather an early date. Insects were noted as abundant in Texas March 5, and in Mississippi March 28.

III. This section (from latitude 32° to latitude 34°) includes central Mississippi, northern Louisiana, southern Arkansas, and northern Texas. Of these, Mississippi alone sent reports on vegetation, etc. These reports are as follows: Last frost, February 28; first leaves, February 10; beginning of real foliage, March 24; first frog, February 4; first toad, February 8; first snake, March 21; first insect, February 17.

IV. This section (from latitude 34° to latitude 36°) includes western Tennessee, northern Arkansas, and Indian Territory. Indian Territory alone reported, and the dates for latitude 34° 11′ were as follows:

[* In this latitude several species of bats must remain active, except during severe weather, throughout the entire year.—C. H. M.]

Last snow March 8; ice broke up January 27; frost came out of ground February 1; last frost March 9; grass started February 1, but stopped in a few days, not to commence again until March 1. Leaves of small size could be found on briars February 29, but even April 8 there were not leaves enough on any tree to make shade. The first flower was found February 2, but no more until February 25, and by March 20 seven kinds only had bloomed. The first frogs were heard February 23. But few insects were noted before March 13. This is the record of a strictly prairie country on the eastern edge of the Great Plains.

V. This section (from latitude 36° to latitude 38°) includes western Kentucky, southern Missouri, and southern Kansas. Only Missouri reported, and as follows: Last snow, April 8; last frost, April 9; first grass, March 18; grass high enough for pasturing, April 1; grass plenty, April 27; first frog, March 2; first snake, March 23; and insects very numerous by April 27.

VI. This section (from latitude 38° to latitude 40°) includes southern Illinois, central Missouri, and northern Kansas. This section supplied an abundance of notes. The last snow of winter melted the first week in February, but later snows came in Illinois and Missouri April 7 and April 22. The ice broke in the Mississippi river February 1, and disappeared from ponds March 15. The first rain occurred March 17. Grass started March 22, and was pretty well up April 6, on which day an especially fast growth was made. Flowers appeared in the bottom lands about March 20, and on the prairies March 30; while from the high, dry lands of western Kansas, none were reported until April 4. The height of the season, as indicated by the opening of the apple-blossoms, was April 29. The first leaves were reported March 25; first foliage, April 19; and the opening of the latest leaves May 10. Frogs appeared in Illinois and Missouri March 15, in eastern Kansas March 26, and in the western part of the State not until the 31st. Snakes were reported March 22; toads about the same date, at which date also clouds of insects suddenly appeared.

VII. This section (from latitude 40° to latitude 42°) includes northern Illinois, southern Iowa, and most of Nebraska. Here, also, snow fell April 1, 7, and 8, and in the northern part on April 20. Ice left the streams March 19; frost came out of the ground February 27, and the last frost was recorded May 3. Grass started during the first week in April; leaves a few days later (April 10), but real foliage did not begin to unfold until May 10; the first flowers were seen April 2, and apple trees were in bloom May 8; the first frogs were heard March 22, but in Nebraska they were not recorded until April 11, which date probably is a little late. Snakes were first noted March 27; toads, in the eastern part, April 20, and in the western part, May 2; insects may be supposed to have appeared about March 26, but 'first' dates were given all the way from March 17 to May 9. It is to be regretted that fuller records were not received from the extreme western parts of the district. Such records would undoubtedly show that in moving westward—in ascending and entering the elevated, treeless, and almost rainless plains—all of the records would be later. This, indeed, is intimated by many of the records of vegetation in hand, and is known to be the case with birds.

VIII. This section (from latitude 42° to latitude 44°) includes southern Wisconsin, northern Iowa, southern Minnesota, and southern Dakota. The winter's snow left this section about March 26, but was quickly succeeded by a severe storm April 1, and by another on the 7th, 8th, and 9th, while the frost kept returning and was heavy even as late as May 29. Ice broke in streams March 26, and in lakes about April 6. Grass started April 25, many flowers having already appeared; apple-blossoms opened May 20; leaves started late (May 2), but grew rapidly, the foliage proper beginning May 15. Frogs appeared March 26; insects on the 31st, and snakes April 10, while toads were not recorded till April 26.

IX. This section (from latitude 44° to latitude 46°) includes the central portions of Wisconsin, Minnesota, and Dakota. The winter's snow was all gone, except in sheltered localities, when the storms came the first week in April. Snow fell over the section April 6, and in most places also on the 7th. By April 10 the snow had all gone. Ice left the smaller streams March 26, and passed out of the Mississippi the 30th. April 6 it disappeared from small lakes, but remained in the larger ones until April 13. Grass started in the west earlier than in the east. In Dakota it began to be seen April 7, but was a few days later in Wisconsin. The first leaves appeared May 10, so that here a larger part of the migration took place among bare trees than in the more southern districts. A few flowers, principally the hardy anemone, or wind flower, were out April 10, but even by May 10 there were not many to be found. Frogs became musical April 4. Only two observations were contributed on snakes, one in Minnesota April 2, and the other in Dakota May 3, giving little clue to the correct dates. A single toad was reported April 4, and he must have been a very early individual. Insects appeared April 3.

X. This section (from latitude 46° to latitude 48°) includes the north-central portions of Minnesota and Dakota and the northern part of Wisconsin. The only note contributed is to the effect that the ice left the large lakes April 20.

XI. This section (from latitude 48° to latitude 50°) includes northern Minnesota and Dakota and southern Manitoba. The only observations contributed relate to a few insects seen April 2, and to the revival of frogs April 15.

From further north than this no notes were received except a single one, which stated that the ice passed out of Lake Winnipeg June 1. In addition to the observations above recorded, a few other data have been contributed. The "Gopher"* was first seen at latitude 39°, March 15;

[* *Spermophilus tridecemlineatus* is here meant.—C. H. M.]

at latitude 41°, in the west, March 28; in the east, April 1; at latitude 43°, in the east, April 12; at latitude 45°, in the west, March 28; and at latitude 47°, in the west, March 27, showing that on the plains of the west these animals awakened simultaneously over a district 400 miles in width; while in the better watered, more thickly wooded, and therefore more chilly eastern portion their winter sleep was much prolonged.

Bats were first seen at latitude 29°, February 27; at latitude 39°, March 23; at latitude 42°, March 28; and at latitude 44°, April 15. Turtles moved their sluggish bodies above water at latitude 39° from March 18 to 21, and at latitude 44° from April 20 to 24. The Tree-toad was heard about the same time (from April 27 to May 3) over the country between latitude 40° and latitude 44° 30′.

LIST OF STATIONS AND OBSERVERS FOR 1884.

Name of observer.	Station.	State.	Latitude.
			° ′
C. H. Wood	Moss Point	Mississippi	30 26
Gideon Mabbett	Rodney	...do	31 52
A. G. Gale	Jackson	...do	32 17
George C. Eyrich	...do	...do	32 17
Judge R. B. Mayes	Yazoo City	.. do	32 50
Maj. G. V. Young	Waverly	...do	33 34
E. M. Hoke	Water Valley	...do	34 08
Dr. Rawlings Young	Corinth	...do	34 55
Dr. T. H. Rye	Southside	Tennessee	36 31
C. W. Butler	Anna	Illinois	37 30
G. C. Bunsen	West Belleville	...do	38 35
W. Ingram	Odin	...do	38 39
Hon. William McAdams	Alton	...do	38 55
Nat. Hist. and Ant. Society, A. W. Harris, President	Hillsborough	...do	39 12
Charles W. Robertson	Carlinville	...do	39 19
H. L. Kelly	Whitehall	...do	39 27
P. H. Rucker	Liter	...do	39 38
A. P. Greene	Sullivan	...do	39 41
T. W. Parker	Griggsville	...do	39 43
W. S. Turner	Quincy	...do	39 55
G. C. Pearson	Danville	...do	40 08
John A. Balmer	...do	...do	40 08
C. W. Carter	Aledo	...do	41 09
Dr. E. O. Boardman	Osceola	...do	41 10
E. E. Soule	Grand Ridge	...do	41 18
Dr. P. R. Sale	Colona	...do	41 28
William Jenkins	Mendota	...do	41 34
H. M. Griswold	Tampico	...do	41 36
Joseph Anthony, jr	Coleta	...do	41 46
P. L. Ong	Hennepin	...do	41 47
John Brady	Batavia	...do	41 49
Frank H. Wentworth	Chicago	...do	41 51
J. G. Parker	... do	...do	41 51
H. K. Coale	...do	...do	41 51
J. R. Daley	...do	...do	41 51
John Gall	Wright's Grove	...do	41 54
H. A. Kline	Polo	...do	41 58
F. F. Kleckner	Davis	...do	42 05
J. E. Dickinson	Rockford	- do	42 16
Gilbert Le Bar	Delavan	Wisconsin	42 37
Dr. P. R. Hoy	Racine	...do	42 45
William Britten	Arthur	...do	42 47
G. W. F. Smith	Milwaukee	...do	43 00
Charles A. Keeler	...do	... do	43 00
C. J. Porter	Jefferson	...do	43 01
Mrs. H. M. Lewis	Madison	...do	43 02
E. H. Stiles	Lake Mills	... do	43 06
Dr. W. S. Burnham	Richland Center	...do	43 19
J. F. Robinson	Leeds Center	...do	43 20
William Toole	North Freedom	...do	43 30
R. E. Mitchell	Merritt's Landing	... do	43 37
John Schrooten	New Cassel	...do	43 43
H. E. Wilsie	La Crosse	...do	43 45
Charles H. Stoddard	...do	...do	43 45
G. T. Cook	Ripon	...do	43 47
W. E. Ritter	Oshkosh	...do	43 59

LIST OF STATIONS AND OBSERVERS FOR 1884—continued.

Name of observer.	Station.	State.	Latitude.	
			°	′
C. F. Carr	Waupaca	Wisconsin	44	22
S. W. Willard	West De Pere	do	44	26
Prof. F. H. King	River Falls	do	44	45
I. N. Ward	Green Bay	do	44	30
John Byrum	do	do	44	30
Rev. F. N. White	Hancock	Michigan	47	10
C. A. Bibbins	Baldwin	Louisiana	29	30
W. W. Edwards	Abbeville	do	29	57
C. A. Bibbins	Mermenton	do		
W. A. Monroe	Newport	Arkansas	35	36
Prof. F. L. Harvey	Fayetteville	do	36	02
Prof. H. Nehrling	Pierce City	Missouri	36	56
N. P. Ball	Reeds	do	37	08
O. Widmann	Saint Louis	do	38	40
F. A. Sampson	Sedalia	do	38	43
Mrs. M. Musick	Mount Carmel	do	38	45
G. E. Stillwell	Kansas City	do	39	06
Prof. J. W. Kilpatrick	Fayette	do	39	09
M. P. Lientz	do	do	39	09
Prof. T. B. Smith	Glasgow	do	39	14
William E. Praeger	Keokuk	Iowa	40	20
Dr. F. Kuithan	Burlington	do	40	50
Prof. C. J. Reed	do	do	40	50
E. L. Ambler	Mount Pleasant	do	41	00
W. A. Lester	Morning Sun	do	41	05
F. Eveland	Ferry	do	41	14
G. K. Cherrie	Knoxville	do	41	19
I. N. Arnold	Richmond	do	41	26
U. S. Grant	Des Moines	do	41	36
C. R. Keyes	do	do	41	36
H. N. Berry	Iowa City	do	41	38
E. F. Vincent	do	do	41	38
J. W. Preston	do	do	41	38
Mrs. V. S. Williams	Coralville	do	41	40
J. W. Preston	Newton	do	41	42
Lynds Jones	Grinnell	do	41	44
Prof. H. Osborn	Ames	do	42	00
Tenny Smith	Grand Junction	do	42	01
Charles F. Henning	Boone	do	42	03
G. D. Peck	La Porte City	do	42	18
Hon. Charles Aldrich	Webster City	do	42	27
E. T. Keim	Dubuque	do	42	30
H. L. Bond	Storm Lake	do	42	37
F. George	Williamstown	do	42	55
Miss J. A. McCleery	Douglas	do	43	00
E. M. Hancock	Waukon	do	43	15
J. W. Lindley	Mitchell	do	43	19
B. E. St. John	Fairmont	Minnesota	43	38
Dr. J. C. Hvoslef	Lanesboro	do	43	43
Thomas Miller	Heron Lake	do	43	48
G. H. Selover	Lake City	do	44	26
Dr. J. H. Sandberg	Red Wing	do	44	32
Rev. G. B. Pratt	Hastings	do	44	45
R. Linton	Pine Bend	do	44	47
E. S. Stebbins	Minneapolis	do	45	00
U. S. Grant	do	do	45	00
H. W. Hamline	do	do	45	00
Dr. P. L. Hatch	do	do	45	00
Court W. Ranslow	Fridley	do	45	05
Vernon Bailey	Elk River	do	45	25
Miss Gertrude M. Lewis	Frazee City	do	46	33
Dr. C. P. Allen	White Earth	do	47	04
Walter Negley	Eagle Pass	Texas	28	43
Dr. Thomas W. Scott	Del Rio	do	29	20
H. P. Attwater	San Antonio	do	29	27
F. Grasst	Sisterdale	do	30	00
Rev. I. B. Henry	Mason	do	30	43
William Lloyd	San Angelo	do	31	22
Dr. Thos. W. Florer	Waxahachie	do	32	23
Mrs. F. M. Houts	Decatur	do	33	11
G. H. Ragsdale	Gainesville	do	33	36
R. P. Burhaus	Denison	do	33	43
W. W. Cooke	Caddo	Indian Territory	34	11
T. J. Dove	Anadarko	do	34	55
O. W. Coggeshall	Darlington	do	35	37
W. W. Cooke	Red Rock	do	36	30
W. J. Dixon	Cimarron	Kansas	37	49
Frank Kizer	Emporia	do	38	21
James McMaster	Ellsworth	do	38	45
Dr. L. Watson	Ellis	do	38	55
Prof. F. H. Snow	Lawrence	do	39	00

LIST OF STATIONS AND OBSERVERS FOR 1884—continued.

Name of observer.	Station.	State.	Latitude.
			° ′
Prof. D. E. Lantz	Manhattan	Kansas	39 12
Dr. C. P. Blachly	do	do	39 12
M. L. Penwell	Washington	do	39 50
J. Nelson, jr	Davenport	Nebraska	40 21
F. C. Kenyon	Unadilla	do	40 47
F. W. Powell	Alda	do	40 53
W. J. Kingsbury	Linwood	do	41 22
Dr. G. S. Agersborg	Vermillion	Dakota	42 56
Percy Edmison	Sioux Falls	do	43 34
S. D. Partch	Barton	do	44 15
G. S. Bishop	Huron	do	44 21
T. P. Lindley	Saint Ansgar	do	46 00
C. B. Strable	La Moure	do	46 30
S. M. Edwards	Argusville	do	47 08
W. T. Tyler	Menoken	do	46 58
T. F. Eastgate	Larimore	do	47 52
Fred Twamley	Grand Forks	do	47 55
Percy Criddle	Two Rivers	Manitoba	49 28
Manitoba Historical and Scientific Society (Rev. George Bryce, president).	Winnipeg	do	49 30
C. W. Nash	Portage La Prairie	do	50 00
A. T. Small	Oak Point	do	50 30

During the migration season of 1885 the general character of the work remained the same. Many new observers added their names to the list, and their reports form a valuable portion of the material received during that year. A great effort was made to fill up those parts of the district which lacked observers in 1884, but with few exceptions this attempt proved unsuccessful, the reason being that there are no persons in these areas who are sufficiently acquainted with birds to report their movements.

A list of the new observers and stations for 1885 was published in the Ornithologist and Oölogist for August, 1885. It contains the names of sixty-nine new observers, and of several of the observers of 1884 who had changed their residence since the previous list was printed. Ninety of the observers of 1884 promised to send notes during the following year, making the whole number of observers in 1885 one hundred and fifty-nine.

LIST OF NEW STATIONS AND OBSERVERS FOR THE YEAR 1885.

Name of observer.	Station.	State.	Latitude.
			° ′
C. J. Lemen	Shawneetown	Illinois	37 43
George Rearden	do	do	37 43
E. J. Edwards	Hillsborough	do	39 12
John A. Balmer	Paris	do	39 34
W. S. Cobleigh	Peoria	do	40 41
Burton Brown	Tampico	do	41 36
George B. Holmes	Fernwood	do	41 42
C. Crotsenburg	Clinton	Wisconsin	42 34
A. B. Wilcox	do	do	42 34
H. L. Skavlem	Janesville	do	42 39
Z. L. Welman	Stoughton	do	42 55
W. W. Gilman	do	do	42 55
F. H. Webb	Fort Atkinson	do	42 56
W. B. Hull	Milwaukee	do	43 00
T. P. Camp	Portage	do	43 31
J. A. Shoemaker	Green Bay	do	44 30
R. R. Byram	do	do	44 30
E. L. Brown	Durand	do	44 36

LIST OF NEW STATIONS AND OBSERVERS FOR THE YEAR 1885—continued.

Name of observer.	Station.	State.	Latitude.
			° ′
O. G. Libby	River Falls	Wisconsin	44 45
F. M. Style	Robert's	....do	44 58
W. S. Libby	New Richmond	....do	45 09
J. P. Peterson	Luck	....do	45 35
A. I. Sherman	Bayfield	....do	46 50
E. C. Wurzlow	Houma	Louisiana	29 34
Gustave Kohn	New Orleans	....do	30 00
S. A. Ball	Reed	Missouri	37 08
Harvey Clark	Butler	....do	38 14
M. Meigs	Keokuk	Iowa	40 20
Col. G. B. Brackett	Denmark	....do	40 43
John Inghram	Burlington	....do	40 50
J. B. Green	Des Moines	....do	41 36
H. L. Bond	Iowa City	....do	41 38
W. M. Clute	....do	....do	41 38
C. R. Keyes	....do	....do	41 38
Lynds Jones	Grinnell	....do	41 44
Prof. H. W. Parker	....do	....do	41 44
Harry E. Peck	La Porte City	....do	42 18
Morton Peck	....do	....do	42 18
Alexander Scougale	Sioux City	....do	42 28
H. S. Williams	State Centre	....do	42 59
Rev. C. E. Cline	Emmetsburg	....do	43 08
John A. Mosher	Spirit Lake	....do	43 26
Pres. R. B. Abbott	Albert Lea	Minnesota	43 58
W. D. Hurlbut	Rochester	....do	44 01
E. A. Wise	Lake City	....do	44 26
G. Graham	Red Wing	....do	44 32
H. Willard	....do	....do	44 32
L. Hancock	....do	....do	44 32
L. D. Perkins	Excelsior	....do	44 55
F. M. Dimond	Excelsior	....do	44 55
H. W. Slack	Saint Paul	....do	45 57
Prof. C. L. Herrick	Minneapolis	....do	44 00
Franklin Benner	....do	....do	45 00
Mrs. L. F. Tinsley	....do	....do	45 00
F. L. Washburn	....do	....do	45 00
H. P. Bennett	Saint Cloud	....do	45 32
W. W. Cooke	Moorhead	....do	46 56
Mrs. C. A. Cooke	White Earth	....do	47 04
Bro. M. Newell	San Antonio	Texas	29 27
Prof. G. Jermy	....do	....do	29 27
Rev. G. Birkman	Fedor	....do	30 20
N. P. Ball	Fort Worth	....do	32 44
H. F. Peters	Bonham	....do	33 34
V. L. Kellogg	Emporia	Kansas	38 21
B. L. Bennett	....do	....do	38 21
William S. Smith	Richmond	....do	38 34
J. F. Williams	Topeka	....do	39 03
N. A. Sherman	York	Nebraska	40 48
A. M. Blanchard	Grand View	Dakota	43 50
George Wilder	Huron	....do	44 21
H. H. Parkhouse	Valley City	....do	46 55
Thomas Russell	Steele	....do	47 01
Fred Twamley	Minto	....do	47 58
Will Dean	Johnstown	....do	48 04
W. C. Bennett	Fort Totten	....do	48 50
Miss Lottie Yeomans	Dalton	Manitoba	....
E. Calcutt	Shell River	....do	....
Frank Wagner	Ossowo	....do	....

[NOTE.—All of the stations enumerated in the above lists for 1884 and 1885 will be found on the accompanying map of the Mississippi Valley. The exact position of each station is indicated by a black triangle. This map is particularly valuable to the student of the migration and distribution of species because it shows at a glance the altitudes of the several areas embraced in the region of which the report treats. Altitude, it is well known, is the principal factor governing the distribution of species in places of the same latitude.—C. H. M.]

In the spring of 1885 Dr. C. Hart Merriam, chairman of the Committee on Migration of the American Ornithologists' Union, prepared and sent out blank schedules for the use of the observers in reporting their notes. A copy (on a reduced scale) of the heading of one of these schedules is here given:

INLAND DIVISION.

1885.

AMERICAN ORNITHOLOGISTS' UNION.

COMMITTEE ON BIRD MIGRATION.

BIRDS OBSERVED AT STATION.

Number of station, ———. Name of station, ——— ———.
Name and P. O. address of observer, ——— ———, ——— ———.

Name of bird.	When was it first seen, and about how many were observed?	When was it next seen?	When did it become common?	When was it last seen?	Is it common or rare?	Does it breed near your station?	Remarks.

On the back of the schedules the following "Instructions" were printed:

INSTRUCTIONS.

In the first column should be stated the exact date when each kind of bird was first seen. This entry should be made on the day the bird arrives—not from memory afterwards (general statements, such as "late in March," "early in April," etc., are of no value). The number observed (approximate) should also be recorded.

In the second column should be stated the date when the same kind of bird was next seen—whether this happens on the very next day, the next week, or not till a month later.

In the third column should be stated the date when the bird becomes common. Some birds come in a body and are common from the day of their first arrival, while others straggle along and are not common for a month or more; and others still are never common.

In the fourth column should be stated the last date when the bird was observed. In the spring migration this column will remain vacant in those species which breed in the neighborhood, as it can be filled only when all the individuals go north. In the fall migration it should be filled in those species which pass farther south, but must remain vacant in those which spend the winter in the vicinity of the station.

In the fifth column should be stated whether the species is abundant, common, tolerably common, or rare.

In the sixth column it is necessary only to say yes or no.

Each schedule contained spaces for noting the movements of 36 species of birds.

In 1885, schedules relating to spring migration were received from 87 observers, distributed as follows: One in Mississippi, 12 in Illinois, 16 in Wisconsin, 1 in Louisiana, 6 in Missouri, 19 in Iowa, 11 in Minnesota, 5 in Texas, 4 in Kansas, 2 in Nebraska, 6 in Dakota, and 4 in Manitoba. These observers sent reports as follows: Twelve occupied less than half a schedule, 21 occupied more than half but less than a whole schedule, 28 sent one full schedule, 10 sent one and a half schedules, 5 sent two schedules, 4 sent two and a half schedules, and 7 sent three or more schedules.

In addition to the schedules several hundred notes were sent in letters. Schedules relating to fall migration were received from 16 observers, distributed as follows: One in Illinois, 1 in Wisconsin, 2 in Missouri, 3 in Iowa, 3 in Minnesota, 2 in Texas, 2 in Kansas, 1 in Dakota, and 1 in Manitoba.

These observers sent reports as follows: Three occupied less than half a schedule, 1 occupied more than half but less than a whole schedule, 9 sent one full schedule, 2 sent two schedules, and 1, Mr. Otto Widmann, sent the most complete record of fall migration that has ever been made in the United States.

NOTES ON THE MIGRATION AND DISTRIBUTION OF EACH SPECIES REPORTED AS INHABITING THE MISSISSIPPI VALLEY.

In the first circular on migration issued by the American Ornithologists' Union, records were called for concerning four movements for each species of bird, namely, the arrival of the first, the arrival of the bulk, the departure of the bulk, and the last one seen. The notes contributed by observers relate principally to first arrivals. Of a few species a number of 'lasts' were noted, and of still fewer the movements of the bulk are recorded with sufficient fullness to serve as the basis of intelligent study.

The second circular issued by the American Ornithologists' Union contained instructions for the year 1885. It called for records of the arrival of the first individual of a species, for the date when it was next seen, when it became common, and when the last one was seen. The records received under the second and third of these headings are very disappointing. These records are voluminous, numbering several thousand, but they are almost without value. The records of the second time the species was seen have served in a few instances as a check on the date of the first arrival, showing whether the first seen was a straggler or a regular arrival, but these instances are very much fewer than had been expected. When the dates of arrival and departure of bulk were asked for, not many observers gave these records, but the notes that were sent were usually of value, since in most instances they indicated a real movement of the species at the date specified.

In my experience the record "common" can not be so interpreted; indeed, it cannot be interpreted in any manner which will throw any light on the movements of the species.

The records for 1885 give no intimation of the arrival or departure of the bulk of the species, but merely furnish notes on the first and the last, with two additional checks on the record of the first seen. What has just been said does not apply to Mr. Otto Widmann's notes for 1885, since, as in former years, he kept a full record of all the movements of each species.

In preparing this part of the report the chief endeavor has been to trace the movements of the van of each species, while the more important part, relating to the movements of the bulk, must be left unnoticed.

The departure of a bird from any point is necessarily followed by its arrival at some other point; so that when a departure is noted a corresponding arrival may be looked for. The record of a typical movement of a species in its northern migration would contain: 1st, the record of the earliest arrival; 2d, the arrival of the bulk of the species at a point somewhat farther south; 3d, the departure of the bulk from a point still farther south; 4th, the departure of the last individual from the southern limit occupied by the species on the same day.

Such a contemporaneous record would prove that during the previous night a general movement of the species had taken place.

Were all the records as full as those of the first arrivals many such typical movements undoubtedly would be found. This, however, would be too much to expect. What we ought to find recorded is an arrival of the bulk of a species for each corresponding departure, and when the stations become sufficiently numerous, and the observers more thoroughly trained, these important items will be forthcoming in many if not in most cases. Then and not till then will something definite be known concerning the distance actually traveled by birds during a single night's migration. The computations based on first arrivals will always be very uncertain, and if accurate information ever is obtained it must come almost entirely from the movements of the bulk.*

In the systematic portion of this report it has been found impracticable to give in full all the notes contributed by the different observers, be-

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[* Again I am forced to differ with Professor Cooke. There is no evidence to show that in any species of bird a sufficiently large proportion of the total number of individuals comprising the migratory host move forward together at one time to justify the description of such a movement as that of "the bulk of the species." On the contrary, migration consists of a series of successive movements or waves, each of which brings a variable number of individuals to places a variable distance in advance of the point or points from which they started. It was the recognition of these facts that led me to omit reference to "bulk" movements in preparing the circular for 1885, and to insert the following statement, of which Professor Cooke makes no mention:

"The committee particularly desires exact records of every increase and decrease in the numbers of a given species over a given area; for it is only by the knowledge of the daily fluctuations of the same species in the same place that the progress and movements of a 'flight,' or 'bird wave,' can be traced. Such data can be contributed by experienced observers only, and in their procurement much time must be spent in the field. During the progress of the migratory movement the observer should go over the same ground day after day, and, if possible, both early in the morning and late in the afternoon. He should visit woodlands, thickets of dense undergrowth, and open fields; and, if possible, both swamp and upland should fall under his daily scrutiny."—C. H. M.]

cause of their voluminousness; nor is it necessary to do so in the present connection. The prime object to be attained is a complete knowledge of the movements of each species. Such knowledge can be gained only by the accumulation of the facts noted by many observers over a term of years. The facts so accumulated will serve as a guide to the time of the appearance and disappearance of each species, and also will serve as a check to the observers' records. By this means the observers will be enabled to correct many mistakes into which they will fall, and will be guided to record many interesting facts which otherwise would escape notice.

The above points have been dwelt upon in order that no observer may feel slighted should he not find credit given for all his observations. For example, some 60 or 70 stations scattered over every State in the district report the White-bellied Nuthatch as a resident. It is enough for present purposes to say that the species is resident throughout the Mississippi Valley. Or if, in the records of migration, 5 or 6 stations situated on the same parallel record the arrival of a species about the same time, it is more intelligible to say that on that date the van reached this latitude, than to give the name, latitude, and date for each of the stations.*

The rule here followed is that the shorter the record the more easily it is comprehended, and the supposition is that the student of this report will always have a map before him. It is useless to attempt to study migration without this aid.

The remaining or systematic portion of the report aims to be entirely historical rather than philosophical or theoretical; and it must be remembered that it is based upon notes, many of which, through lack of sufficient ornithological knowledge on the part of the observer, undoubtedly are erroneous, but which, since they bear on their face the appearance of truth, have been accepted as facts. Hence, while great care has been taken to make the statements as accurate as possible, errors undoubtedly have crept in, and the author will consider it a special favor if those who discover such will communicate the fact to him.

There remains the pleasant duty of acknowledging the assistance received from various sources. The first acknowledgments are due to the observers, without whose able and united efforts nothing could have been accomplished. These persons have given their time and thought to the work without compensation, stimulated only by their love of nature and their interest in scientific work; and many have expressed the pleasure it afforded them by the statement "the enjoyment we have derived from the work has more than repaid us." To Dr. C. Hart Merriam the thanks of all are due for his untiring zeal in bringing the work before the public and enlisting the services of observers, and for the

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[*I cannot agree with Professor Cooke in this method of treating records of migration. Owing to the difference in altitude of stations on the same parallel, and to the influence of topography and other local conditions, I deem it necessary to give in full the exact records of each observer.—C. H. M.]

laborious task of editing the manuscript of this report and seeing it through the press. Mr. Ridgway, both as representing the Smithsonian Institution, and personally, has aided in settling disputed points of identification and distribution; and Mr. Allen and Dr. Coues have assisted in the same manner. Nor should the able efforts of Prof. D. E. Lantz, of Manhattan, Kans., be forgotten. Not only did he furnish, for two years, a very full and acceptable set of notes on migration, but when the sickness of the author threatened to prevent the completion of this report, Professor Lantz came to his assistance, and, although already burdened by his own private work, found time to write nearly one-eighth of the systematic portion of this report. Last, but not least, should the author endeavor to acknowledge his indebtedness to Mr. Otto Widmann, of Saint Louis, Mo. When the work was begun and its future seemed clouded in doubt, his voluminous and valuable notes turned the scale; later, when delays and discouragements came, his advice and encouragement awoke renewed vigor and interest. Not only does the material contributed by Mr. Widmann form the most valuable part of the present report, but during its preparation his aid has been so constant that it is perhaps not too much to say that his name should be included as joint author.

Thanks are due, also, to the U. S. Signal Service for kindly furnishing weather reports and maps.

SECOND PART.

SYSTEMATIC REPORT.

1. **Æchmophorus occidentalis** (Lawr.). [729.] *Western Grebe.*

An inhabitant of western North America, coming eastward to Manitoba. Twenty years ago Donald Gunn discovered this Grebe breeding abundantly at Shoal lake and Lake Manitowaba, Manitoba (Smithsonian Report for 1867, pp. 429–430). More recently Prof. John Macoun, botanist to the Geological and Natural History Survey of Canada, found it breeding "in thousands" on Waterhen river; and still more recently Mr. Ernest E. T. Seton (now E. E. Thompson) has recorded specimens from Long lake, Manitoba (The Auk, Vol. II, 1885, p. 314).

2. **Colymbus holbœllii** (Reinh.). [731.] *Holbœll's Grebe; American Red-necked Grebe.*

A northern species, coming south in winter irregularly to the northern half of the Mississippi Valley; has been taken as a rare visitant at Alda, Nebr. Said to breed in northern Manitoba.

3. **Colymbus auritus** Linn. [732.] *Horned Grebe.*

Winters over most of the Mississippi Valley and breeds from northern Illinois northward; reported by various observers in Missouri, Nebraska, and Wisconsin. In 1885 it arrived at Lake City, Minn., April 23.

4. **Colymbus nigricollis californicus** (Heerm.). [733a.] *American Eared Grebe.*

Occurs throughout the western row of States in the district; breeds from Texas northward, and winters from Texas southward; was noted by observers at Saint Louis, Mo., Manhattan, Kans., Ellis, Kans., and Vermillion, Dak. In the spring of 1885 it was first reported from Emporia, Kans., April 14, and again April 30. At Saint Louis, Mo., the first, a male, came April 24. In the fall of 1885 it was seen at Emporia September 8 and at Saint Louis September 22. It remained at Saint Louis until October 7.

5. **Colymbus dominicus** Linn. [734.] *St. Domingo Grebe.*

This is a tropical species, coming north to the valley of the lower Rio Grande in Texas. Near Fort Brown it is a "rather common resident" (Merrill, Proc. U. S. N. Mus., 1878, p. 172). It occurs at least as far up the river as Lomita ranch, above Hidalgo (Sennett, Bull. U. S. Geol. and Geog. Sur. Ter., Vol. V, No. 3, 1879, p. 440).

6. **Podilymbus podiceps** (Linn). [735.] *Pied-billed Grebe; Hell Diver; Dabchick.*

Winters wherever there is open water, from Illinois southward, and breeds from southern Indiana, Illinois, Missouri, and eastern Kansas northward. The records for 1884 are so irregular that it can only be said that during the last of April and first of May the Dabchick was migrating on both sides of the forty-third parallel, and appeared May 6 at Portage la Prairie, Manitoba. In the fall of 1884 it was first seen at Emporia, Kans., September 20 and was common the same day.

The records for 1885 are scarcely more regular than those for 1884. Its arrival was noted at Laporte City, Iowa, April 1; Lanesboro, Minn., April 3; Saint Louis, Mo., April 6; Paris, Ill., April 19; Heron Lake, Minn., April 9, and Shell River, Manitoba, May 3. In the fall of 1885 the first came to Emporia, Kans., September 16, and to Shawneetown, Ill., October 3. The last left Lanesboro, Minn., November 9, and Saint Louis, Mo., October 27. Mr. Lloyd states that it is tolerably common in winter in Tom Green and Concho counties, Texas (The Auk, Vol. IV, 1887, p. 184).

7. **Urinator imber** (Gunn.). [736.] *Loon.*

Breeds from northern Illinois and Minnesota northward. Occurs in winter at suitable localities over most of the Mississippi Valley, even as far south as San Angelo, Tex. (Lloyd), Corpus Christi bay (Sennett), and Waverly, Miss. (Young). During the first eleven days of April in 1884 it was recorded at various places from latitude 39° to latitude 45° 25′, and May 1 it reached Oak Point, Manitoba.

In the spring of 1885 two sets of notes were contributed. The first was as follows: Laporte City, Iowa (lat. 42° 18′), March 31; New Cassel Wis. (lat. 43° 40′), April 4; Excelsior, Minn. (lat. 44° 55′), April 5; Emmetsburg, Iowa (lat. 43° 8′), and Saint Louis, Mo. (lat. 38° 40′), April 6; Heron Lake, Minn. (lat. 43° 48′), April 8; Lanesboro, Minn. (lat. 43° 43′), April 9. The second set was: Luck, Wis. (lat. 45° 35′), April 20; Des Moines, Iowa (lat. 41° 36′), Ferry, Iowa (lat. 41° 14′), and Lake Mills, Wis. (lat. 43° 6′), April 21, and Shell River, Manitoba, May 4. The last left Saint Louis, Mo., April 11, and Ferry, Iowa, April 29. In the fall of 1885 the last left Heron Lake, Minn., November 7.

9. **Urinator arcticus** (Linn.). [738.] *Black-throated Diver.*

Breeds in the far north, coming south in winter, rarely to the Great Lakes.

11. **Urinator lumme** (Gunn.). [740.] *Red-throated Diver.*

A northern species; breeding about the larger lakes in Manitoba, and thence northward; dispersed in winter irregularly over the northern half of the Mississippi Valley.

21. **Synthliboramphus antiquus** (Gmel.). [753, 759.] *Ancient Murrelet; Black-throated Guillemot.*

Inhabits the islands and shores of the North Pacific; accidental once on Lake Koshkonong, Wis. (Sennett, Auk, Vol. I, 1884, p. 98).

36. Stercorarius pomarinus (Temm.). [697.] *Pomarine Jaeger.*

Breeds in the far north, coming south to the Great Lakes in winter. "Winter visitant to Lake Michigan" (Ridgway); "twice seen in Nebraska" (Aughey).

37. Stercorarius parasiticus (Linn.). [698.] *Parasitic Jaeger.*

Breeds in the far north, coming south in winter to the Great Lakes, and even to Illinois (Ridgway).

38. Stercorarius longicaudus Vieill. [699.] *Long-tailed Jaeger.*

Breeds in the Arctic regions, coming south in winter to the northern States; "casual winter visitant in Illinois" (Ridgway).

40. Rissa tridactyla (Linn.). [658.] *Kittiwake.*

A northern species, coming south in winter to the Great Lakes. It has been noted from Minnesota (Hatch), and Illinois (Nelson); and March 17, 1884, one was seen by Dr. P. R. Hoy at Racine, Wis.

42. Larus glaucus Brünn. [660.] *Glaucous Gull.*

Another northern species, appearing as a winter visitant at Lake Michigan, and once taken as far south as Clay county, Tex. (Ragsdale, Bull. N. O. C., Vol. VI, 1881, p. 187). Dr. P. R. Hoy took a fine specimen at Racine, Wis., March 17, 1884.

43. Larus leucopterus Faber. [661.] *Iceland Gull.*

Breeds in the far north, coming south in winter to the Great Lakes; occurs regularly on Lake Michigan (E. W. Nelson).

47. Larus marinus Linn. [663.] *Great Black-backed Gull.*

Breeds from the Gulf of St. Lawrence northward, coming south in winter to the Great Lakes (Lake Michigan, Nelson).

51a. Larus argentatus smithsonianus Coues. [666a.] *Herring Gull.*

Breeds from southern Minnesota northward, and migrates over nearly the whole of the Mississippi Valley. This species was seen at Chicago in the winter of 1883–'84, and usually a few winter on Lake Michigan. As a rule it is found in winter throughout Illinois and thence southward to the Gulf of Mexico. The severe cold of January, 1884, drove it almost entirely out of Illinois. One was seen at Saint Louis after the river began to be full of floating ice. It returned to Saint Louis January 29; two days later a party of eighteen went north, and February 3 between seventy-five and eighty-five went north above the Mississippi. At Heron Lake, Minn., the first came March 24. They breed from Heron Lake northward. There is a record of a large Gull, probably this species, from Oak Point, Manitoba, April 21.

At Chicago, Ill., Herring Gulls were common throughout the winter of 1884–'85, and as the Mississippi river did not freeze over they remained all winter at Saint Louis, Mo. Their migration at that place in the spring of 1885 began February 27, and the next day they were seen going north in regular migration wedge, taking their annual overland route just in the rear of the city, cutting short the great bend which the Mississippi river makes north of Saint Louis. Many old birds in beautiful plumage were seen all day soaring in majestic gyrations at enormous heights above the Mississippi. At Saint Louis the last was seen April 12; at Lake City, Minn., the first April 26, and the last May 10. In the fall of 1885 the first was seen at Milwaukee, Wis., August 8, and the last November 21.

53. **Larus californicus** Lawr. [668.] *California Gull.*

A rare visitant from the west. Colonel N. S. Goss shot one on the Arkansas river, in Reno county, Kans., October 20, 1880.

54. **Larus delawarensis** Ord. [669.] *Ring-billed Gull.*

Breeds from the northern tier of States northward; occurs in winter as far north as southern Illinois, and occasionally Saint Louis, and is a common winter resident along the coast of Texas and Louisiana. It was shot in Chicago harbor in the latter part of December, 1883. In 1884 the first migrant was seen at Saint Louis February 26, and the bulk came to Vermillion, Dak., March 31. The other dates are more or less irregular.

In the spring of 1885 the only arrivals noted were as follows: Emporia, Kans., April 30; Luck, Wis., April 17, and Heron Lake, Minn., April 9.

In the fall of 1885 it left Heron Lake November 11. According to Ridgway it is a summer resident in the northern part of Illinois, but is not yet known certainly to breed there.

58. **Larus atricilla** Linn. [673.] *Laughing Gull.*

Belongs more particularly to the South Atlantic and Gulf States; breeds plentifully on the coasts of Texas and Louisiana, and a few pass up the Mississippi during the summer as far as southern Illinois. It is not known from Kansas, but was recorded by Mr. Powell at Alda, Nebr., in July 1880.

59. **Larus franklinii** Sw. & Rich. [674.] *Franklin's Gull.*

Franklin's Gull breeds from southern Minnesota and Dakota northward; winters in the Southern States, and migrates principally west of the Mississippi river. The records of its movements are irregular and unsatisfactory. In 1884 it arrived at Portage la Prairie, Manitoba, April 21. In 1885 it was reported from Emporia, Kans., April 10. It breeds abundantly in Dakota and western Minnesota, and thence northward. Until within a few years its presence anywhere in the United States in summer was considered a rare occurrence. In 1879 Roberts and Benner found it common in the Traverse Lake region in western Minnesota in June (Bull. Nutt. Ornith. Club, Vol. V, 1880, p. 20). In 1884 Mr. Thomas Miller reported it as an abundant summer resident at Heron Lake, in southwestern Minnesota; and Mr. J. W. Preston has recently found it breeding in numbers in western Minnesota, where it is said to have arrived April 9, and left September 29, 1885 (Ornithologist and Oölogist, Vol. XI, No. 4, April, 1886, pp. 54-55). October 22, 1884, Mr. S. W. Willard took a female near the mouth of Fox river, in eastern Wisconsin.

60. **Larus philadelphia** (Ord.) [675.] *Bonaparte's Gull.*

Breeds from Manitoba northward (and probably in northern Minnesota as well); winters along the Gulf of Mexico and southward, and sometimes in Illinois. In the spring of 1884 it was noted from Lanesborough, Minn., April 23, and from River Falls, Wis., April 28. In 1885 it arrived at Hennepin, Ill., April 17.

62. **Xema sabinii** (Sab.). [677.] *Sabine's Gull.*

Breeds in the Arctic regions, coming south in winter rarely and irregularly to the United States. It is a rare winter visitant at Lake Michigan (Nelson), and was taken once in Kansas in the fall (at Humboldt, September 21, 1876, by Col. N. S. Goss).

63. **Gelochelidon nilotica** (Hasselq.). [679.] *Gull-billed Tern; Marsh Tern.*

Breeds commonly in suitable places along the coast of Texas; rare inland, but has been reported irregularly from other parts of the Mississippi Valley.

64. **Sterna tschegrava** Lepech. [680.] *Caspian Tern.*

An irregularly distributed species, common in the Gulf of Mexico, where it breeds at various places along the coasts of Texas and Louisiana. Mr. Hatch gives it in his list of Minnesota birds, and Mr. Preston has taken it in central Iowa. There is also a record of three that were shot at Cincinnati October 9, 1882.

65. **Sterna maxima** Bodd. [681.] *Royal Tern.*

A southern species, breeding commonly along the coasts of Texas and Louisiana. A summer visitant in Illinois.

67. **Sterna sandvicensis acuflavida** (Cabot). [683.] *Cabot's Tern.*

An inhabitant of the South Atlantic and Gulf coasts, breeding commonly along the coast of Texas.

69. **Sterna forsteri** Nutt. [685.] *Forster's Tern.*

The most common Tern of the Mississippi Valley, wintering in the South, and breeding from Texas to Dakota, Minnesota, Wisconsin, and Manitoba. In 1884 it was noted from Manhattan, Kans., May 1; and a Tern, probably of this species, was seen at Oak Point, Manitoba, May 17.

In 1885 it was seen at Emporia, Kans., April 18; and at Heron Lake, Minn., April 21. In the fall of 1885 two birds, young of the year, were seen at Lanesboro, Minn., August 21, and the species was last seen at Heron Lake, October 14.

70. Sterna hirundo Linn. [686.] *Common Tern.*

Breeds commonly on the larger lakes in Manitoba, and has been noted at various places in the Mississippi Valley. It was recorded as a migrant at West De Pere, Wis., and as having been taken by Mr. Preston in central Iowa.

74. Sterna antillarum (Less.). [690.] *Least Tern.*

Chiefly coastwise, but passes up the Mississippi Valley to Dakota and Minnesota. Breeds abundantly along the Gulf coast in Louisiana and Texas; also in the interior; known to breed in Kansas and Dakota.

In the fall of 1885 it appeared at Emporia, Kans., August 12; was last seen at Saint Louis, Mo., August 31, and returned to Bonham, Tex., August 20.

75. Sterna fuliginosa Gmel. [691.] *Sooty Tern.*

A tropical and subtropical maritime species of wide distribution; common along the Gulf coast.

77. Hydrochelidon nigra surinamensis (Gmel.). [693.] *Black Tern.*

Winters beyond our border, and breeds from southern Illinois and Kansas, northward. In 1884 it was noticed at Saint Louis April 29, and at Heron Lake, Minn., May 1. May 17 it came to Oak Point, Manitoba; May 15 it was passing over Laporte City, Iowa, in large flocks. In the fall of 1884 the first flock appeared at Emporia, Kans., August 19.

In the spring of 1885 they were seen at Emporia, Kans., and Heron Lake, Minn., the last day of March and the first day of April. They arrived at Luck, Wis., April 17; at Huron, Dak., May 14, and May 18 eleven were seen at Shell River, Manitoba, latitude 50°. They were seen during the whole summer at Emporia, Kans., the extreme western limit of their breeding range. In the fall of 1885 they were reported at Richmond, Kans., July 25; again August 4, and common August 12. The last left Heron Lake, Minn., November 11; a few were seen at Saint Louis, Mo., October 7, and the last left there October 21. The first came to Bonham, Tex., August 22. Mr. Lloyd says it is tolerably common in western Texas in fall migration.

78. Hydrochelidon leucoptera (Temm.). [694.] *White-winged Black Tern.*

A European species; accidental once at Lake Koshkonong, Wis. (Kumlien, specimen now in U. S. National Museum).

79. Anous stolidus (Linn.). [695.] *Noddy.*

A tropical and subtropical maritime species; reported as breeding abundantly along the coast of Texas.

80. Rynchops nigra Linn. [656.] *Black Skimmer.*

A maritime species, breeding abundantly on the islands along the Gulf coast in Louisiana and Texas.

115. Sula sula (Linn.). [652.] *Booby.*

A tropical maritime species coming north to the Gulf States; reported as not common along the coast of Texas.

117. Sula bassana (Linn.). [650.] *Gannet.*

A maritime species, breeding in the North Atlantic and Gulf of St. Lawrence, and coming south in winter when it sometimes occurs along the coasts of the Gulf States.

118. Anhinga anhinga (Linn.). [649.] *Anhinga; Snake Bird.*

Resident in the Southern States, where it is commonly called the "Water Turkey." In summer it passes north regularly to southern Illinois; and it has been taken once in western Kansas (in August, 1881). It was noted by the observers from Mississippi to San Angelo, Tex. On the south Concho, near the latter place, it is a tolerably common fall migrant (Lloyd). In eastern Texas it breeds abundantly (Nehrling).

In the fall of 1884 the first migrant appeared at San Angelo, Tex., September 19. It was again seen September 21 and September 30. One was shot and mounted by Mr. Munroe at Newport, Ark. (lat. 35° 36′), during the winter of 1884–'85.

120. Phalacrocorax dilophus (Sw. and Rich.). [643.] *Double-crested Cormorant.*

Winters in the Southern States, rarely north to Illinois; breeds from Minnesota and Dakota northward. In migration it is common throughout the Mississippi Valley. In 1884 it arrived at Saint Louis March 27; at Laporte City, Iowa, March 31, and at Lanesboro, Minn., probably April 4; the bulk arriving just a month later, May 4. The full record from Saint Louis is as follows: March 27, first (three) pass north; April 3 to 5, flocks passing north; April 15, height of the season; May 11, bulk of young go north; May 22, last seen.

In the spring of 1885 the first north-bound troop came to Saint Louis, Mo., March 31, and the same day a single bird was seen at Emmetsburg, Iowa. They reached Laporte City, Iowa, April 2; Heron Lake, Minn., April 11; Lanesboro, Minn., April 21; and Shell River, Manitoba, May 13. The last flock was seen at Saint Louis, Mo., April 20. This Cormorant used to breed abundantly in a few places in northern Iowa, where Mr. Preston, of Newton, Iowa, says he has taken a great many sets of eggs. In the fall of 1885 the first came to Lanesboro, Minn., September 29, and the last left Heron Lake, Minn., November 16. It was first seen at Saint Louis, Mo., October 5.

120a. Phalacrocorax dilophus floridanus (Aud.). [643*a*.] *Florida Cormorant.*

Resident along the Gulf coast; in summer, north to Illinois; sometimes winters in southern Illinois. Has been taken at Saint Louis, Mo. One was shot in western Texas in the fall of 1880.

121. Phalacrocorax mexicanus (Brandt). [644.] *Mexican Cormorant.*

A common resident along the coast of Texas; occurs in the Mississippi Valley as far north as southern Illinois and Kansas. One was killed near Lawrence, Kans., April 2, 1872, and another in Mitchell county, Kans., in the spring of 1881.

125. Pelecanus erythrorhynchos Gmel. [640.] *American White Pelican.*

Winters abundantly in the Gulf States, and breeds from southern Minnesota northward. The records for 1884 show plainly that they are not those of the real 'firsts,' but the dates when the species happened to be seen, and nothing further can be obtained from them than the general statement that during the month of April this species was migrating in Missouri, Illinois, Iowa, Nebraska, Dakota, and Minnesota. At Vermillion, Dak., at least five hundred were seen in a single flock April 21.

In the spring of 1885 flocks of Pelicans, probably this species, were seen at Gainesville, Tex., March 7 and April 6. They were reported from Cimarron, Kans., March 9; Mount Pleasant, Iowa, March 18; Grinnell, Iowa, March 30; and Huron, Dak., April 3. The last were seen at Linwood, Nebr., April 16; Ferry, Iowa, April 29; Manhattan, Kans., May 1; and at Heron Lake, Minn., 30 were seen May 10, and 50 May 12.

In the fall of 1885 the first, a flock of 11, came to Grinnell, Iowa, September 13, and the first was seen at Emporia, Kans., October 13; at Saint Louis, Mo., the first was seen September 14; a large body passed over October 6, and the last was seen October 7.

126. Pelecanus fuscus Linn. [641.] *Brown Pelican.*

A southern species; accidental once in Illinois, where it was seen by Mr. C. K. Worthen. It is a common resident along the Gulf coast, and breeds abundantly in eastern and southeastern Texas. Mr. C. W. Beckham states that it is said to breed in the lakes above Bayou Sara, Louisiana. (Bull. N. O. C., Vol. VII, 1882, p. 165.)

128. Fregata aquila (Linn.). [639.] *Man-o'-War Bird.*

Resident along the Gulf coast. The Man-o'-War Bird is strictly a maritime species, hence its occurrence at a distance of 800 miles from the nearest salt water is a matter of special interest. One was killed with a stone while sitting on a tree in Osborne county, Kans., August 16, 1880. It was mounted by Mr. Frank Lewis, of Downs, Kans. He has lost track of the specimen, but a photograph of it, taken after mounting, is now in my possession and identifies it beyond a doubt. A still more remarkable case occurred during the same month (August, 1880) in Wisconsin. A Man-o'-War Bird was killed while flying in the vicinity of Humboldt, a small village on the Milwaukee river a few miles north of Milwaukee, Wis. The bird was preserved and is now in the Milwaukee Public Museum.

129. Merganser americanus (Cass.). [636.] *American Merganser.*

A common species, wintering from Kansas and Illinois southward, and breeding from Minnesota northward. In 1884 the bulk reached Burlington, Iowa, March 5; Newton, Iowa, March 17, and the first came to Heron Lake, Minn., March 24.

In the spring of 1885 it was seen at Shawneetown, Ill., February 27, and was not again seen until it had reached Heron Lake, Minn., March 26. It was afterwards noted at Des Moines, Iowa, April 4; Lanesboro, Minn., April 4; and Green Bay, Wis., April 7. It has been found breeding in northern Iowa by Mr. Preston, of Newton, Iowa. In the fall of 1885 a large flock was seen at Saint Louis November 12.

130. Merganser serrator (Linn.). [637.] *Red-breasted Merganser.*

A winter resident in southern Wisconsin, along Lake Michigan, throughout the State of Illinois, and southward. Breeds from northern Illinois and Minnesota northward. In 1884 it was only noticed in migration at Heron Lake, Minn., where it arrived April 2.

In the spring of 1885 a flock of about 200 was seen at Emporia, Kans., March 7, and at Laporte City, Iowa, March 25. April 1 there was a queried note from Lanesboro, Minn., and April 4 they reached Heron Lake, Minn. They were taken also during spring migration at Tampico, Ill.

131. Lophodytes cucullatus (Linn.). [638.] *Hooded Merganser.*

In Illinois the Hooded Merganser is resident throughout the State and breeds everywhere. In Kansas it is a common winter resident and breeds very rarely. A few breed in Florida. In western Texas it is common in winter. It is common and breeds in Wisconsin, Minnesota, Dakota, and Manitoba.

In the spring of 1884 it reached Burlington, Iowa, March 15; Laporte City, Iowa, March 17; Heron Lake, Minn., March 24; Green Bay, Wis., March 28; and Red Wing, Minn., April 4. It was known once to remain throughout the winter at Lanesboro, Minn., in an open part of the Root river.

In the fall of 1884 the first migrant appeared at Des Moines, Iowa, October 24, and the last was seen November 17. It was given as a very rare bird at San Angelo, Tex., where one was shot in 1884.

In the spring of 1885 it was seen at Shawneetown, Ill., February 27; Heron Lake, Minn., April 4; Des Moines, Iowa, April 9; Emporia, Kans., April 14; Hastings, Minn., April 13; Menoken, Dak., May 1. A nest with twelve fresh eggs was found at Peoria, Ill., April 20. At Waverly, Miss., it is said to nest in March. In the fall of 1885 it was last seen at Heron Lake, Minn., November 30.

132. Anas boschas Linn. [601.] *Mallard.*

The Mallard occurs in suitable places over the whole of the northern hemisphere. It is the best known of the Mississippi Valley Ducks, and for this reason is here taken as their type. It is one of the most hardy species, and is pretty sure to be found among the first that arrive in spring. When notes have been sent in merely saying that "Ducks" have been seen, they have been brought under this head, so that the present discussion is not so much that of the Mallard in particular as of Ducks in general. The Mallard breeds from Indiana and Iowa northward, and a few breed as far south as Kansas. In winter they are usually resident in southern Illinois and southern Kansas, but the extreme cold of the 1st of January, 1884, froze all ponds, lakes, and rivers, compelling them to move further south. In southern Missouri, consequently, they were unusually abundant during the winter of 1883–1884, and at Caddo, Ind. Ter., a few stayed through the winter, but the great majority moved much further south. Like the Robin and other hardy species, they remain far north when the conditions are favorable. Given food and open water no degree of cold seems to affect them. Some habitually remain on the Illinois river in northern Illinois; seven were seen January 11, at Vermillion, Dak., where they were never before seen in winter; and several spent the winter, enduring a temperature of more than 35° below zero, at Lake Pepin, Minn., and in a small open creek near the same place; while they have been often known to winter around the warm springs in Wyoming. At Moss Point, Miss., only a few miles from the Gulf, the first Mallards arrived November 15, 1883, and the bulk from December 1 to December 15. They were present by thousands during their short "winter," and the bulk left the coast about the middle of January. All were gone February 1, at which date the bulk had hardly passed north of the Gulf States, so that during the latter part of January and the first half of February the great mass of the Mallards was gathered between parallels 33° and 37°. In southern Louisiana the movements of Ducks in general began somewhat later, but they were fairly under way by February. Probably few Mallards were included in this flight, which was principally composed of the coast Ducks rather than the river Ducks. Before this, in the latter part of January, and the first few days of February, the warm wave had caused great movements among the river Ducks. They returned to southern Illinois, and to those parts of southern Missouri up to Saint Louis, from which they had been driven early in January. The limit of this movement was at Odin, Ill. (lat. 38° 39′), and, on the Mississippi river, at Alton, Ill. (lat. 38° 55′). In the West the wave was scarcely felt north of Caddo, Ind. Ter., and not at all in the northern part of the Territory, where the moisture which fell in copious rains in the southern portion was precipitated as snow and sleet. Then followed a month of constant swaying to and fro, the flight advancing one day to be driven back the next by fierce northern blasts. During the entire month practically no headway was made. A few stragglers managed to force their way northward for a short distance, reaching Danville, Ill.; Ferry, Iowa; Fayette, Mo.; Unadilla and Linwood, Nebr.; but the bulk made little movement, scarcely passing beyond the Gulf States; and the struggle was temporarily terminated about the 1st of March by a "second winter," which recongealed the open water and sent the Ducks back to winter quarters. At Waverly, Miss., the course of events, according to Major Young, was as follows:

In both years, 1883 and 1884, Ducks went north at the same time, and under the same conditions. There was a big overflow of the Tombigbee river in February, which brought immense numbers of Ducks. On February 12, 1884, they were going north in large flocks; February 14 they returned, coming back just at the time we had a cold wave from the north. We had fine Duck shooting until the storms of February 22 and 23, when they disappeared. The varieties killed were Pintails, Mallards, Gadwalls, Black Ducks, and Sheldrakes. By March 18 only a few Ducks were left.

At Saint Louis the thaw began March 9, and was fairly under way on the 10th. Ducks began to return, and the first real advance since February 1 was made March 10. By the 12th and 13th they had moved to latitude 41° 10′ in Illinois, and 41° 42′ in Iowa. The movement rapidly gained headway. The Ducks had been held back so much later than usual that as soon as a movement was possible it was participated in by the whole family. March 15 and 16 were great days for migration, aided by a warm south wind. The movement was peculiar in that the bulk was almost abreast of the van. The first had not yet appeared in Wisconsin, the most northern record being Polo, Ill. (lat. 41° 58′), but the bulk was only a few miles in the rear, being recorded from latitude 41° 36′. In Iowa the van was at latitude 42° and 42° 1′, and the bulk in all favorable localities from latitude 41° 40′ southward. In the West the van had come to Vermillion, Dak. (lat. 42° 56′), and the bulk to Linwood, Nebr. (lat. 41° 22′).

From this time on each day was marked by a record of advance. Southern Wisconsin was reached March 18; northern Iowa and southern Minnesota on the 20th and 21st. March 23 was the day of an immense flight of about a dozen species at Heron Lake, Minn., all coming from the west as if from the Missouri valley, at the nearest point of which they had arrived some days previously. On this day also they reached Waupaca, Wis., latitude 44° 22′. During the next three days the records show advances in Minnesota and Dakota to latitude 45° 25′ in the former, and up the Missouri river to latitude 46° 58′ in the latter. They were reported at Frazee City, Minn. (lat. 46° 33′), March 31; at Argusville, Dak. (lat. 47° 08′), the day before; at Two Rivers, Manitoba (49° 28′), April 12, and Oak Point, Manitoba (50° 30′), April 16. There were not many records of the arrival of the bulk in the North, but they indicate that the bulk and van kept pretty close together up to about latitude 45°, when the van pressed forward, while the bulk was delayed by April storms.

Returning to the South, we find that the bulk left Louisiana and Texas about the middle of March; they left latitude 39° the last of March and the first week in April, and latitude 43° about the third week in April. North of this parallel so many Ducks remained to breed that no departures were given.

In the fall of 1884 the first migrant appeared at Des Moines, Iowa, October 1, and at Emporia, Kans., October 9. At the latter place it had become common by the 25th of October, and was last seen December 1.

For the spring of 1885 all notes giving the arrival of "Ducks," with no specific name have been brought under this head, as was done in treating of spring migration in 1884. No notes were contributed on the movements of Ducks south of latitude 38°; hence nothing can be said of their whereabouts until the first full wave of migration brought them to Cimarron, Kans., February 26. The next day they were seen at Shawneetown, Ill. This was the opening day of spring migration at Saint Louis, Mo. The advance continued for several days. Ducks were reported from Griggsville, Ill., February 28; and during the first five days of March, from Mount Carmel, Mo., and Fayette, Mo. (two observers); Ferry, Iowa; Mount Pleasant, Iowa; Knoxville, Iowa; Sioux City, Iowa; Emporia, Kans.; and Unadilla, Nebr. It will be noticed that this is the same bird wave which is described under the migration of the Canada Goose, but while the Geese pushed on into Dakota, no Ducks were noted north of Sioux City. Yet, contrary to the usual rule, the van in the West was farther north than in the East, just as it was with the Geese, and this difference became still more pronounced when the next wave (that of March 11) carried the advance guard along the plains to Heron Lake, Minn., while nearer the Mississippi it pushed forward but a few miles to Morning Sun, Richmond, Newton, and Grinnell, Iowa. Immense numbers of Ducks were on the wing March 11 throughout the country from Griggsville, Ill., to Newton, Iowa; but very little northward advance was made. During the spring migration of 1884 it was noted by Mr. Miller that Ducks came to Heron Lake, Minn., from the west, as if they were a part of the Missouri river flight. In 1885 they must have come from the same direction, since in the region south of Heron Lake, in Iowa, at an equally favorable locality (Emmetsburgh), none were seen until about two weeks later. There can be no doubt that in the spring of 1885 the flight of Ducks and Geese along the Missouri river was several days earlier than at corresponding latitudes on the Mississippi river. Another wave occurred in Iowa March 14. It was noted at Iowa City and Laporte City, Iowa, and by both observers at Tampico, Ill. The next day the temperature at Saint Vincent, Minn., was fourteen degrees below zero, and the hosts of Ducks in central Iowa returned south, following the example set March 14 by the Ducks at Heron Lake. They returned March 25, and were noted March 26 at Emmetsburgh and Williamstown, Iowa, Huron, Dak., and Stoughton, Wis. March 30 and 31 they appeared at New Cassel, Wis., Fridley, Minn., and Menoken, Dak. Thus the western flight extended still further north than the eastern. April 1 they were reported at Argusville, Dak.; April 5, at Larimore, Dak., and Two Rivers, Manitoba; and April 7 at our most northern station, Oak Point, Manitoba, in latitude 50° 30′.

In the fall of 1885 they were still at Heron Lake, Minn., as late as December 1. The last one was seen at Lanesboro, Minn., November 22; at Grinnell, Iowa, November 4; and at Fernwood, Ill., November 7. The first migrant was reported from Grinnell, Iowa, September 10; Fernwood, Ill., September 12; Iowa City, Iowa, October 6; Saint Louis, Mo., September 6, with an increase September 22; Shawneetown, Ill., October 3; Richmond, Kans., October 4; and from Bonham, Tex., October 16. At the last-named place Ducks became common November 4.

133. Anas obscura Gmel. [602.] *Black Duck.*

Though principally a bird of the Eastern States the Black Duck is not rare in the northern part of the Mississippi Valley. In winter it occurs in the Gulf States. It is rare in western Manitoba. According to the reports of observers, it is resident in Louisiana and Texas;* and it breeds in Iowa and Illinois, but not in Kansas or Nebraska. In 1884 it arrived at Frazee City, Minn., April 1. In the fall of 1884 the first migrant appeared at San Angelo, Tex., August 3. In 1883 the first was seen there August 8.

In the spring of 1885 it arrived at Fayette, Mo., April 1, and a female at Gainesville, Tex., April 24.

In the fall of 1885 the first came to Fernwood, Ill., September 12; it was next seen there October 3, and last, November 7, on which date it was seen also at Shawneetown, Ill.

134. Anas fulvigula Ridgw. [603.] *Florida Duck.*

This Duck, originally described from Florida, has been found in Kansas, and doubtless occurs regularly in Louisiana and eastern Texas, if not throughout the intermediate region.

Col. N. S. Goss, in his Revised Catalogue of the Birds of Kansas (1886), says of it: "Migratory; rare. Arrives about the middle of March. I captured a female at Neosho Falls, March 11, 1876, and have since shot one, and observed two others in the State" (p. 6).

135. Anas strepera Linn. [604.] *Gadwall.*

The Gadwall is widely distributed, ranging over most of the northern hemisphere. It winters abundantly in the Gulf States, and sometimes remains in Illinois in mild winters; it is also known to winter near a warm spring in Wyoming. It breeds locally throughout most of its range. Col. N. S. Goss considers it a rare breeder in Kansas. At Moss Point, Miss., it comes in November and leaves in February. In 1884 it arrived at Ellis, Kans., March 14, Manhattan, Kans., March 19, and Saint Louis March 21, furnishing a curious exception to the usual rule that western birds arrive later than eastern. It arrived at Heron Lake, Minn., March 23, and remained to breed. In the fall of 1884 the first migrant was seen at Des Moines, Iowa, October 28, and the last November 10.

In the spring of 1885 it was reported from Emporia, Kans., and Heron Lake, Minn., March 29; from Des Moines and Laporte City, Iowa, April 1 and 3, and from Shell River, Manitoba, May 12. In the fall of 1885 the last was seen at Heron Lake, Minn., November 13.

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* Probably those which breed in Louisiana and Texas really belong to the next species, *A. fulvigula.*

136. Anas penelope Linn. [606.] *Widgeon.*

An inhabitant of the northern parts of the Old World; accidental in eastern North America; frequent in Alaska. Has occurred in Wisconsin (Kumlien), and Illinois (Nelson).

137. Anas americana Gmel. [607.] *Baldpate.*

The Baldpate ranges over the whole of North America. In winter it is common in the Gulf States and lower part of the Mississippi Valley. It breeds chiefly in the North, but is known to breed in Manitoba, Dakota, Minnesota, Nebraska. Kansas, Illinois, and Texas. Its movements in migration resemble those of the Gadwall. In the fall of 1884 it was first seen at Emporia, Kans., October 12.

In the spring of 1885 it reached Emporia, Kans., March 21; Des Moines, Iowa, March 23; Heron Lake, Minn., March 26; Emmetsburgh, Iowa, April 1, and Menoken, Dak., April 5. In the fall of 1885 it was last seen at Heron Lake, Minn., November 13. The first fall migrant appeared at Saint Louis, Mo., October 16.

139. Anas carolinensis Gmelin. [612.] *Green-winged Teal.*

Breeds in Manitoba and along our northern border, and winters in the Southern States and southward. Like the Mallard, this is a hardy Duck, and remains in winter just as far north as open water extends, which is usually to southern Kansas and southern Illinois. In the winter of 1883–'84 it probably did not stay much north of Caddo, Ind. Ter., southern Missouri, and northern Mississippi, but moved northward the last of January. At Moss Point, Miss., it arrived from October 15 to October 31 and was abundant; it then passed south to return in bulk during April. In 1884 the real movement began in early March, and by the 8th it had advanced to Manhattan, Kans., and Danville, Ill., and also to Vermillion, Dak. March 22 found it at Huron, Dak.; March 24 at Heron Lake, Minn., and the bulk arrived at Two Rivers, Manitoba, April 17. In the fall of 1884 the bulk arrived at Des Moines, Iowa, October 25, and the last left there November 17. In 1883 the first reached San Angelo, Tex., September 20.

In the spring of 1885 the record of its northward migration was too irregular to be of much value. The following notes will give the general outline of its movements in the West: It was recorded from Emporia, Kans., March 13; Des Moines, Iowa, March 18; Heron Lake, Minn., March 26; Huron, Dak. (both observers) and Menoken, Dak., April 7; Shell River, Manitoba, May 2. It was seen in pairs at Fernwood, Ill., May 2, and probably was nesting there. In the fall of 1885 the first was seen at Bonham, Tex., October 4; at San Angelo, Tex., September 20; at Des Moines, Iowa, September 10, and at Saint Louis, Mo., September 22. The last at Heron Lake, Minn., was seen November 13. None were seen at Des Moines, Iowa, after November 4.

140. Anas discors Linn. [609.] *Blue-winged Teal.*

Breeds in Manitoba and the northern part of the Mississippi Valley, and winters from the Southern States southward. At Moss Point, Miss., it is said that this species "comes from October 15 to November 1; remains only a short time; goes farther south, and passes north in April." This is true of the bulk of the species, but some flocks can be found throughout the winter in all the Southern States and north to southern Illinois. Dr. J. C. Merrill states that at the mouth of the Rio Grande, in extreme southeastern Texas, "a few remain during the winter, but the great majority go farther south, returning about the middle of March." In 1884 it was reported as breeding in Kansas, Nebraska, Iowa, Illinois, Minnesota, and Dakota; and it breeds locally throughout most of the rest of its range. In migration in the spring of 1884 it was the most abundant Duck passing over Pierce City, Mo., the first of February, but made no real headway until March. The bulk reached Newton, Iowa, March 17, spreading over the rest of Iowa, and arriving at Heron Lake, Minn., by April 2. It is not usually found among the first arrivals of Ducks, but surpasses them all in numbers when the main flight comes. It reached Vermillion, Dak., April 11, Menoken, Dak., April 20, and was reported from Portage la Prairie, Manitoba, April 16.

In the fall of 1884, at Des Moines, Iowa, the last was seen November 10. The first migrant reached Emporia, Kans., August 30; the next September 22, and it became common October 12. At San Angelo, Tex., it was first seen August 10, and was common on the 10th and 21st of September. In 1883 it had appeared there September 1, and became common by September 20.

In the spring of 1885 the first flight of Ducks over the district between latitude 39° and latitude 42° was so delayed that the Blue-winged Teal came with the van; but north of latitude 43° it assumed its usual position as one of the later migrating Ducks. At Shawneetown, Ill., it was first seen February 23; at Cimarron, Kans., March 1; Fayette, Mo., March 10; Emporia, Kans., March 29; Des Moines, Iowa, April 4; Sioux City, Iowa, April 5; Heron Lake, Minn., April 11; Huron, Dak., April 14; Menoken, Dak., April 22; Shell River, Manitoba, May 2.

The Blue-winged Teal breeds over so much of the Mississippi valley that it is difficult to trace its southward migration. In the fall of 1885 the first was recorded from Grinnell, Iowa, September 10; Ellsworth, Kans., September 15; Emporia, Kans., September 1; Saint Louis, Mo., where it became numerous three days later, September 1; Shawneetown, Ill., September 28; Bonham, Tex., October 4; San Angelo, Tex., September 4. They were common at Grinnell, Iowa, October 4; Ellsworth, Kans., October 15; Saint Louis, Mo., September 22, where they were still numerous October 24; Bonham, Tex., October 28. The last was seen at Heron Lake, Minn., November 9; Milwaukee, Wis., November 14; and Grinnell, Iowa, November 4.

141. Anas cyanoptera Vieill. [610.] *Cinnamon Teal.*

This western Teal is not uncommon in middle and western Kansas, where it probably breeds (Goss). It has been found repeatedly in western Texas, where it is a rare fall migrant; it occurs in migration in eastern Texas, but is not common (Nehrling), and is not rare during migration near the mouth of the Rio Grande (Merrill). It is an occasional visitant in Manitoba, Minnesota, Nebraska, Illinois, and Louisiana. In 1883 it reached Emporia, Kans., March 22.

142. Spatula clypeata (Linn.). [608.] *Shoveller.*

Winters from southern Illinois southward; breeds abundantly in the Northern States and Manitoba, and sparingly in Texas, northern Illinois, and Kansas. Breeds in great numbers at Heron Lake, Minn. Its time of migration is one or two days behind that of the Gadwall. In the fall of 1884 the first Shoveller was reported from Des Moines, Iowa, and San Angelo, Tex., October 28; and from Emporia, Kans., October 24.

In the spring of 1885 an early migrant was seen at Sioux City, Iowa, March 27. The regular advance was reported March 31 and April 1 from Fayette, Mo., Des Moines, Iowa, Laporte City, Iowa, and Fernwood, Ill. The first was seen at Emporia, Kans., April 4; at Lanesboro, Minn., and Menoken, Dak., April 19, and Shell River, Manitoba, May 8. In the fall of 1885 the last at Heron Lake, Minn., was seen November 13.

143. Dafila acuta (Linn.) [605.] *Pintail; Sprigtail.*

Breeds in Manitoba and the northern tier of States, and, like the other river Ducks, is common during the winter in the Gulf States, and occasionally as far north as Illinois, but it also goes much further south. It is one of the earliest Ducks to migrate and was one of the most abundant of those which so strenuously endeavored to work northward during February in 1884. It came to Pierce City and Saint Louis, Mo., January 31 and February 1, and February 26 more than 50 flocks, mostly of this species, passed over Saint Louis. This movement was checked the last of February, and commenced again March 8 and 9, bringing the species to Ellis and Manhattan, Kans., Storm Lake, Iowa, and Vermillion, Dak. Those which wintered south of the United States arrived in bulk at Moss Point, Miss., March 15, and remained until about the middle of April. March 12 to 15 were days of movement in Illinois, and Pintails spread over the whole of the State; March 23 they arrived at Heron Lake, Minn.; and April 16 they were noted at Portage la Prairie, Manitoba. They breed principally in British America, but also at Spirit Lake, Iowa, Heron Lake, Minn., and sparingly in Illinois.

In the fall of 1884 the first Pintail was seen at Des Moines, Iowa, October 15, and the last November 15. The first was seen at San Angelo, Tex., September 19. In 1883 the first reached San Angelo September 12.

A few Ducks of this species spent most of the winter of 1884–'85 at Shawneetown, Ill. The only record of their wintering further north than Shawneetown was received from Mr. W. B. Hull, of Milwaukee, Wis. Mr. Hall writes:

> For about a week the whole bay was frozen over with ice from 12 to 14 inches thick. During this time the pot-hunters butchered numbers of Pintail Ducks. The Ducks were half starved and would allow a man to approach within 20 feet of them. Icemen were cutting ice close to the shore, and Ducks came right among them to get to the open water. A friend who was on the ship Oneida during her twenty-five days in the ice, said that the Ducks (Pintails mostly, but a few "northern" ducks, he did not recognize), were "frozen in." When walking on the ice near the boat he saw hundreds of Ducks in a solid casing of ice. In the winter of 1873-'74 they were killed in the same way.

In the spring of 1885 migration began during the last week of February. Flocks of about 400 birds passed Cimarron, Kans., February 26. The next day several flocks of Pintails, "the first ducks of the season," passed over Saint Louis, Mo. Large numbers were seen at Shawneetown, Ill., February 28. Concerning their presence at Saint Louis on that day Mr. Widmann writes:

> From 7 a. m. till noon an almost steady stream of ducks passed over in flocks of from 30 to 60, the larger part being Sprigtails, so far as I could see. There was hardly any time when at least one flock could not be seen in some direction, but oftener half a dozen could be counted at the same time. Many flocks followed the Mississippi, but the majority turned off to the west just south of the city, in order to reach the Missouri river, or the large tracts of land between the mouths of the Missouri and Illinois rivers. Thousands have passed this city to-day.

As in the case of most of the other ducks, during the spring migration of 1885, the flight west of the Mississippi was more rapid than on the east. March 2 flocks were seen at Emporia, Kans., where they were common March 3; March 4 they were seen at Sioux City, Iowa, and March 8, at Linwood, Nebr. March 11 to 14 they were noted from Aledo, Ill.; Tampico, Ill.; Newton, Iowa; Des Moines, Iowa; Laporte City, Iowa; and Heron Lake, Minn. March 26 there were "myriads" of them at Emmetsburgh, Iowa. The first flocks came to Fernwood, Ill., March 31. The bulk left Des Moines, Iowa, the night of April 2. They were very common at Heron Lake, Minn., March 30. The first came to Larimore, Dak., April 7; Menoken, Dak.; and Ossowo, Manitoba, April 7, and they were common all over Manitoba by April 20. In the fall of 1885 the first were seen at Fernwood, Ill., September 12, and at San Angelo, Tex., September 4. The last at Ossowo, Manitoba, was seen November 1, and at Heron Lake, Minn., November 9.

144. Aix sponsa (Linn.). [613.] *Wood Duck.*

A well-known inhabitant of temperate North America; breeds throughout the Mississippi Valley, and is resident from southern Illinois southward. In Manitoba it is a rare summer resident.

Mr. Wood writes that at Moss Point, Miss., the young hatch in March, and he has never seen a male of this species in summer. In the spring of 1884 it arrived at Saint Louis March 12; at latitude 40° 8′, in Illinois, March 15; at latitude 41° 40′, in Iowa, March 16; in Wisconsin, at latitude 44° 22′, March 23; and in Minnesota, at latitude 44° 32′, April

3. In the fall of 1884 the first migrant was reported from Des Moines, Iowa, October 18. The bulk arrived there October 25, and the last was seen November 10.

In the spring of 1885 the first Wood Ducks were seen at Shawneetown, Ill., February 27; at Mount Carmel, Mo., March 17; Des Moines, Iowa, March 19; Emporia, Kans., March 29; Laporte City, Iowa, March 26; and during the first five days of April they were noted from Heron Lake, Lanesboro, Lake City, Excelsior, Minneapolis, and Elk River, Minn., and from Durand, Wis. In the fall of 1885 they began to come out from their breeding places and fly on the river at Shawneetown, Ill., August 20. The last at Heron Lake, Minn., was seen October 13; at Saint Louis, Mo., the bulk arrived September 22.

146, **Aythya americana** (Eyt.). [618.] *Redhead.*

Breeds in Manitoba and the northern tier of States; range much the same as that of the Canvas-back, but more abundant than it in the Southern States. At Moss Point, Miss., in 1883, they came about the middle of November, and were abundant all winter. Mr. Wood, of Moss Point, says that about March 1 they collect on the islands, load themselves with sand, and when a favorable wind comes they go with it.* They were a common winter resident at San Angelo, Tex., and great flocks were still present March 5, 1884. March 8 they came to latitude 39° 12′, in Kansas; March 11 they were at latitude 38° 40′, in Missouri; March 12 at latitude 41° 40′, in Iowa; March 14 at latitude 38° 55′, in Kansas; March 15 at latitude 41° 36′, in Illinois; March 22 at latitude 42° 18′, in Iowa; March 24 at latitude 42° 56′, in Dakota, and at latitude 43° 48′, in Minnesota, at both of which places they breed; March 25 they were at latitude 41° 58′, in Illinois, and April 18 at latitude 44° 32′, in Minnesota. April 16 they came to Portage la Prairie, Manitoba.

In the fall of 1884 the first Redhead was seen at Des Moines, Iowa, October 10, and the last November 15. In 1883 the first came to San Angelo, Tex., where it is common in winter, October 1.

In the spring of 1885 the records were irregular. The species was recorded from Emporia, Kans., March 2; Heron Lake, Minn., March 29, and irregularly from intermediate points. The most southern breeding record came from Clear Lake, Iowa.

In the fall of 1885 the first was seen at Iowa City, Iowa, October 6, and the last at Heron Lake, Minn., November 26. At Saint Louis, Mo., the first was seen October 16, and the bulk arrived October 24.

147. **Aythya vallisneria** (Wils.). [617.] *Canvas-back.*

Rather rare away from the coast in winter, but has been known to occur in southern Illinois. A few breed at Heron Lake, Minn., and

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[* I have heard the same habit attributed to Ducks in Newfoundland and other places, but am not aware that there are any facts on which the notion is based.—C. H. M.]

thence northward. In the spring of 1884 they appeared at Gainesville, Tex., March 2; Manhattan, Kans., March 8; Saint Louis, March 11; and Heron Lake, Minn., March 24. At Waupaca, Wis., they were seen March 29, and at Vermillion, Dak., April 3. April 16 they were reported from Portage la Prairie, Manitoba.

In the spring of 1885 the first were seen at Emporia, Kans., March 18; at Heron Lake, Minn., March 30, where they were common the next day. They were reported from Laporte City and Emmetsburgh, Iowa, April 1; and from Menoken, Dak., and Ossowo, Manitoba, April 6 and 7. In the fall of 1885 the last left Heron Lake, Minn., November 27. Mr. Lloyd says that in Tom Green and Concho counties, Tex., they are tolerably common in early winter.

148. Aythya marila nearctica Stejn. [614.] *Blue-bill; Scaup Duck.*

After wintering in the Southern States, especially along the Gulf coast, the Big Black-head passes over the entire length of the Mississippi Valley, to nest in Manitoba and northward. In 1884 it was reported from Carlinville, Ill., February 13; Laporte City, Iowa, March 22, and the next day reached Heron Lake, Minn., where a few remained to breed. It arrived at Portage la Prairie, Manitoba, April 16.

In the spring of 1885 this was the only species of Duck whose record did not contain an irregular note. It was seen at Laporte City, Iowa, (lat. 42° 18′), March 27; Emmetsburgh, Iowa (lat. 43° 8′), March 30; Heron Lake, Minn. (lat. 43° 48′), April 1; Huron, Dak., (lat. 44° 21′, two observers), and Menoken, Dak. (lat. 46° 58′), April 3; and Shell River, Manitoba (lat. 50°), April 7. The most southern breeding record of this species was from Clear Lake, Iowa (lat. 43° 26′). In the fall of 1885 the last was seen at Heron Lake, Minn. (lat. 43° 18′), November 27.

149. Aythya affinis (Eyt.) [615.] *Little Blue-bill; Lesser Scaup Duck.*

Range much the same as that of the last, but known to breed as far south as Clear Lake, Iowa. It is an abundant summer resident in western Manitoba. In 1884 it came to Saint Louis, February 26, and after being driven away by the cold, returned March 11; advanced to Burlington, Iowa, March 12, and on the 24th was reported from Vermillion, Dak., Storm Lake, Iowa, Heron Lake, Minn., and Portage la Prairie, Manitoba.

In the fall of 1884 the first migrant appeared at Emporia, Kans., November 8.

In the spring of 1885 the notes on its migration were too irregular to be of any value. In the fall of 1885 the last was seen at Heron Lake, Minn., November 9. The first migrant appeared at Saint Louis, Mo., September 22. In western Texas it is tolerably common in winter.

150. Aythya collaris (Donov.). [616.] *Ring-necked Duck.*

This is known in northern Minnesota as the "Fall Duck," and is very abundant during fall migration. A few breed in Minnesota, at least as far south as Minneapolis, where its eggs have been taken by Dr. Thomas S. Roberts. It was reported as breeding at Clear Lake, Iowa, and thence northward. Its range is much the same as that of the Scaup Ducks. In 1884 it was seen at Saint Louis, Mo., and Manhattan, Kans., March 20 and 21, at Green Bay, Wis., March 26, and Red Wing, Minn., April 2. In the fall of 1884 the first migrant appeared at Emporia, Kans., October 24.

In the spring of 1885 the first was seen at Des Moines, Iowa, March 19, and at Heron Lake, Minn., April 1. The last was seen at Des Moines April 9, and at Heron Lake April 15. In the fall of 1885 the first was seen at Iowa City, Iowa, October 3, and at Emporia, Kans., October 10. The last record from Heron Lake, Minn., was November 9; and a few were still present at Lanesboro, Minn., November 30. Mr. Lloyd states that they are common in Concho county, Tex.

151. Glaucionetta clangula americana (Bonap.). [620.] *Golden-eye; Whistler.*

Breeds in the Northern States. During the winter the Golden-eye is found wherever there is open water, even as far north as the Great Lakes. It was seen on Lake Michigan (near Chicago) all winter in 1883–'84, and also winters on Lake Erie. A flock was reported as remaining all winter in an open creek near Fridley, Minn., but probably it was composed of Barrow's Golden-eye (*G. islandica*), which has been found often in Minnesota during the winter. In migration in the spring of 1884 the common Golden-eye reached Laporte City, Iowa, March 16, Heron Lake, Minn., March 23, and Green Bay, Wis., March 28. The bulk arrived at Green Bay April 15.

During the winter of 1884–'85 many Golden-eyed Ducks remained, as usual, at the southern part of Lake Michigan, near Chicago.

In the spring of 1885 migrants were noted at Laporte City, Iowa, March 30, Fernwood, Ill., April 4, Heron Lake, Minn., April 1, Green Bay, Wis., April 10, and Shell River, Manitoba, April 28.

152. Glaucionetta islandica (Gmel.). [619.] *Barrow's Golden-eye.*

A northern species, coming south in winter irregularly to Manitoba and the Upper Mississippi Valley. One was taken at Mount Carmel, Ill., in December, 1874 (Nelson), and one at Minneapolis, Minn., January 13, 1877 (Roberts). Dr. Roberts states that a few years ago, at the falls of Saint Anthony, in Minnesota, "a flock of these ducks used to spend the winter in the pool below the cataract."

153. Charitonetta albeola (Linn.). [621.] *Butterball; Buffle-head.*

Breeds at Clear Lake, Iowa, Heron Lake, Minn., and northward. Winters on Lake Michigan (at Chicago); on the Lower Missouri river, and southward. In eastern Texas it is abundant in winter near the coast (Nehrling). In 1884 the bulk arrived at Burlington, Iowa, March 13, and at Vermillion, Dak., the first were seen the same day. They arrived at Storm Lake, Iowa, and at Heron Lake, Minn., March 24.

March 25 they were seen at Polo, Ill., and April 4 at Red Wing, Minn.

In the spring of 1885 the first were noted at Shawneetown, Ill., February 27, Emporia, Kans., March 13, Des Moines, Iowa, March 24, Laporte City, Iowa, March 30, Fernwood, Ill., March 31, New Cassel and Luck, Wis, April 4, and Shell River, Manitoba, April 27.

In the fall of 1885 they returned to Fernwood, Ill., September 12, were common there October 3, and left Heron Lake, Minn., November 30. Rare in Concho county, Texas, where one was shot in the spring of 1886 (Lloyd).

154. **Clangula hyemalis** (Linn.). [623.] *Old-squaw.*

This and the six following species breed in the far North, entering the Mississippi Valley in winter only, and chiefly in the northern and middle portions, near the great rivers and lakes. The Old-squaw is found throughout Illinois in winter, and small flocks are occasionally seen during the fall migration at Saint Louis, Mo., Vermillion, Dak., and in Minnesota.

155. **Histrionicus histrionicus** (Linn.). [622.] *Harlequin Duck.*

The Harlequin Duck breeds in British America and migrates southward in fall. It is found throughout Illinois in winter, and has been taken at Saint Louis, Mo.

160. **Somateria dresseri** Sharpe. [627a.] *American Eider.*

Breeds along the Atlantic coast from Maine to Labrador; migrates south and southwest in winter, often reaching the Great Lakes. Has been taken in Illinois (Nelson), and Wisconsin (Hoy).

162. **Somateria spectabilis** (Linn.). [629.] *King Eider.*

Breeds in the northern portions of the northern hemisphere; in fall migrates south, occurring on the Great Lakes in winter. There are records from Illinois (Ridgway), and Wisconsin (Hoy).

163. **Oidemia americana** Sw. and Rich. [630.] *Black Scoter.*

Breeds far north, coming south in winter to the United States. It has been found at Saint Louis, Mo., and Laporte City, Iowa, and is a rare visitant to Minnesota. Mr. C. W. Butler writes that on May 2, 1883, he saw fifty at Anna, Ill., all busily engaged in picking up millet seed that had just been sown.

165. **Oidemia deglandi** Bonap. [632.] *White-winged Scoter.*

Generally distributed throughout Illinois in winter, but most common on Lake Michigan. Has been taken once at West DePere, Wis., twice in Minnesota, and once at Saint Louis, Mo.

166. **Oidemia perspicillata** (Linn.) [633.] *Surf Scoter.*

Occurs in winter on all the larger streams in Illinois, as well as on Lake Michigan. Has been taken at Saint Louis, Mo., and at Laporte City, Iowa.

167. Erismatura rubida (Wils.). [634.] *Ruddy Duck.*

The Ruddy Duck breeds over much of the Mississippi Valley, from Texas to Minnesota, and winters from southern Illinois southward. Dr. Watson recorded it from Ellis, Kans., in these words: "A variably common transient visitor; once a pair nested here." In the spring of 1884 the first was seen at Saint Louis February 26, and Vermillion, Dak., March 28. It was seen at Caddo, Ind. Ter., during fall migration, but not in the spring. In the fall of 1884 the first was seen at Emporia, Kans., October 24.

In the spring of 1885 the only note received was the record of its arrival at Emporia, Kans., April 18. In the fall of 1885 the last was seen at Heron Lake, Minn., November 7.

168. Nomonyx dominicus (Linn.). [635.] *Masked Duck.*

A tropical American species, accidental in the United States; one specimen taken at Lake Koshkonong in Wisconsin (Kumlien).

Chen cærulescens (Linn.). [590.] *Blue Goose.*

Breeds on Hudson Bay; migrates through the Mississippi Valley, and winters along the Gulf coast, in mild winters extending up to northern Mississippi and southern Illinois. During migration it was noticed at Burlington, Iowa, where the bulk arrived March 20, 1884.

169. Chen hyperborea (Pall.). [591a.] *Lesser Snow Goose.*

Breeds in Alaska; a regular migrant in the Mississippi Valley; winters abundantly on the Gulf of Mexico. In Kansas it is a common migrant, and a few sometimes winter. In 1884 it was reported from West DePere, Wis., and Alda, Nebr. In Tom Green and Concho counties, Tex., it is tolerably common during spring migration.

It migrates early. In 1884 large flocks were seen at Pierce City, Mo., by the last of January, and one flock had arrived at Saint Louis. No more were recorded until after the "second winter." At Caddo, Ind. Ter., it was first seen March 10. March 19 and March 20 it appeared at Manhattan, Kans., and again came to Saint Louis. March 21 it reached Vermillion, Dak., and four days later was at Huron, Dak. It was reported from Menoken, Dak., April 12, and the next day at Larimore. Farther east the bulk reached Burlington, Iowa, April 1, and the first came to Storm Lake, Iowa, March 25, the bulk following on the 14th, which was the day that the last was seen at Saint Louis.

In the fall of 1884 the first flock of Snow Geese was seen at Emporia, Kans., October 20, after which date the species was common there.

In the spring of 1885 it was noted from Richmond, Kans., March 4; Fayette, Mo., March 10; Unadilla, Nebr., March 11; Linwood, Nebr., March 25; Sioux City, Iowa, March 30; Huron, Dak., March 31; Grand View, Dak., April 1; Fernwood, Ill., April 4, and Two Rivers, Manitoba, April 14. In the fall of 1885 it returned to Argusville, Dak., September 20; to Saint Louis, Mo., October 27, and to Bonham, Tex., October 3. It was common at Argusville, October 4, and at Bonham October 23.

169a. Chen hyperborea nivalis (Forst.). [591.] *Greater Snow Goose.*

The eastern representative of the preceding; occurs in winter chiefly along the Atlantic coast, but sometimes enters the Mississippi Valley. In western Manitoba it was reported to be an abundant spring migrant, but less common in the fall (Thompson). Possibly the foregoing was mistaken for it.

171a. Anser albifrons gambeli (Hartl.). [593a.] *White-fronted Goose.*

Breeds in the far North; winters in the Gulf States and southward, in mild winters occurring as far north as southern Illinois. Migratory over the rest of the Mississippi Valley. In 1884 the first reached Manhattan, Kans., March 8, where they were common March 15. March 20 they arrived at Saint Louis; and April 1 at Vermillion, Dak. The bulk came to Storm Lake, Iowa, April 14.

In the spring of 1885 the first report of arrival was from Des Moines, Iowa, April 1. The only other notes were from Menoken, Dak., April 23, and Ossowo, Manitoba, May 11. In the fall of 1885 the last was seen at Heron Lake, Minn., November 2.

Dr. Agersborg says that in southeastern Dakota it is a rare migrant, "always found associating with the Snow Geese." Mr. Lloyd states that in Tom Green and Concho counties, Tex., it is "tolerably common in winter." Mr. Nehrling states that in eastern Texas, near Houston, it "is the first Goose to arrive from the North in autumn, but they all migrate further south."

172. Branta canadensis (Linn.). [594.] *Canada Goose.*

Winters in the southern half of the United States, and breeds on both sides of our northern boundary. It breeds regularly at Heron Lake, Minn., and has been known to breed in southern Illinois (Nelson). Such is a brief statement of its range, but the records in the winter of 1883–'84 furnish material for a more detailed statement. During December Geese were not uncommon up to latitude 38°, but during the extreme cold of January only stragglers could be found north of latitude 35°. January 11 a flock of 25 to 30 was seen at Vermillion, Dak., where they had never before been seen in winter. January 4 a flock of fifty passed over Manhattan, Kans., flying east. From Caddo, Ind. Ter., southward they were seen all winter, or at least every few days. The first movement took place in January. January 11 they passed over Yazoo City, Miss., flying north, and when the warm waves came the last of the month they pressed rapidly forward. They reached Saint Louis January 22. January 25 was a great day for Geese, many troops going north. February 1 they passed north over Pierce City, Mo., in large flocks, and arrived at Glasgow, Mo., Odin, Ill., and Unadilla, Nebr. February 4 the first movement was noticed at Abbeville, La., among the flocks which had been wintering there. But all this movement was cut short by the cold of February and the first week of March. During the rest of February there was but little movement and no real progress. Geese were reported during February from Richmond, Iowa, Osceola, Ill., and Linwood, Nebr., but were not noted from neighboring stations, and were not followed by more until March. They must be considered as irregular migrants possessed of more ambition than brains.

The real migratory movement dates from February 26. On this day the regular migrants began to pass over Eagle Pass, Tex., and the great bulk began to leave southern Louisiana. This wave reached Caddo, Ind. Ter., March 3; Darlington, Ind. Ter., March 5, and latitude 39° in Missouri and Illinois about the 10th. From this parallel northward the advance will be traced along the three lines of migration: east and west of the Mississippi, and along the prairie region. March 13 the flight advanced to latitude 41° 36′ in Illinois; March 15 to latitude 31° 51′ at Chicago, where a flock of over a thousand was seen flying east, probably aiming for the open waters of the lake; March 16 to latitude 41° 58′ in Illinois, and latitude 42° 37′ in Wisconsin; March 20 and 21 to latitude 43° 02′, 43° 06′, and 43° 47′ in Wisconsin. West of the Mississippi the record reads: March 13 the advance was at latitude 41° 05′, and latitude 41° 19′ in Iowa; March 12 it was at latitude 41° 38′ and 41° 42′ in Iowa; March 14 at latitude 41° 40′ and latitude 42° 01′ in Iowa; March 15 at latitude 42° and 42° 55′ in Iowa. Hence it appears that from the 12th to the 15th of March many Geese were passing through central Iowa. March 20 they were reported at latitude 43° 19′ in Iowa; March 22 at latitude 43° 43′ in Minnesota; and March 23 at latitude 44° 47′, 45° 05′, and 45° 25′ in Minnesota, and at Portage la Prairie, Manitoba (latitude 50°).

On the prairies the notes indicate arrivals, March 13, at latitude 42° 56′, in Dakota; March 20, at latitude 44° 15′, 44° 21′, and 46°, in Dakota; March 24, at latitude 46° 58′ and 47° 52′, in Dakota; and April 3, at Two Rivers, Manitoba, latitude 49° 28′.

The bulk passed through northern Illinois about March 19, through southern Wisconsin March 23, and the middle of the State March 27. It crossed Iowa from March 20 to March 22, and reached central Minnesota about the 1st of April. Still further west the bulk came to latitude 39°, in Kansas, about the middle of March, passed through Nebraska the 18th to 20th, and was uniformly reported in Dakota, up to latitude 46°, on March 24; and then, as if delayed by the April storms, was not given at latitude 46° 58′, in Dakota, until April 22. The bulk left southern Wisconsin about April 1, and Kansas the first week of the month. We can not help envying Mr. Powell, who writes, that April 11 they were gradually leaving Alda, Nebr., after coming all in a bunch, and that he killed forty in one day over decoys in the Platte river.

In the fall of 1884 the first migrant was reported from Mount Carmel, Mo., November 11. It first appeared at Emporia, Kans., September 25, and the species had become common there by October 20.

In the spring of 1885 few Geese left their winter home until the migration season had fairly opened; the winter had been too severe to invite them to remain north of their usual winter range. A flock was seen at Keokuk, Iowa, January 4, and another at Glasgow, Mo., January 6. At Shawneetown, Ill., they remained in large numbers most of the winter, though during the blizzards they disappeared for a few days. A few early migrants were noted at Fayette, Mo., February 2, and at Sedalia, Mo., February 9, but no pronounced movement took place until February 28. This was two days later than the movement commenced in 1884, and there was no similarity whatever in the order of advance for the two years, 1884 and 1885. In the spring of 1884 the van kept very nearly along the same parallel on all three lines of migration during its advance from latitude 39° to latitude 45°, while in 1885 the migratory movement was peculiar. If, with the eastern extremity of Lake Superior for a center, segments of circles are drawn over the Upper Mississippi Valley, the first extending from central Dakota to southern Illinois, the next from the northwest corner of Iowa to east central Illinois, a third passing through northeastern Iowa, and a fourth ending at Chicago, these lines would represent the progress of the advance line of Geese during the month of March, 1885. Nothing similar to this has been noticed in the movement of any other species during either 1884 or 1885. The records group themselves around four sets of dates, namely, March 1–5, March 10–12, March 26–27, and March 30–31. On the last day of February large numbers of Geese passed Saint Louis, and March 1 they were seen at Ellsworth, Kans. During the first five days of March they were noted at Griggsville, Ill., Mount Pleasant, Iowa, Ferry, Iowa, Knoxville, Iowa, Richmond, Iowa, Grinnell, Iowa, Newton, Iowa, Emmetsburgh, Iowa, Unadilla, Nebr., Linwood, Nebr. (a flock had been seen at Linwood as early as February 26), Sioux City, Iowa, and Grand View, Dak. March 6 they came to Paris and Aledo, Ill. March 10–12 they appeared at Tampico, Ill. (two observers), Morning Sun, Iowa, Iowa City, Iowa (two observers), Heron Lake, Minn., and Saint Cloud, Minn. March 26 and 27 they were noted at Williamstown, Iowa, Durand Wis., and Elk River, Minn. Not until the last days of March did they arrive at Batavia, Ill., Fernwood, Ill., Chicago, Ill., Delavan, Wis., and Lake Mills, Wis. The remaining records are: Menoken, Dak., March 26; Argusville, Dak., and Two Rivers, Manitoba, April 1, and Oak Point, Manitoba, April 7. In the fall of 1885 the last Goose was seen at Ossowa, Manitoba, November 28; at Heron Lake, Minn., December 1, and at Grinnell, Iowa, December 5. The first migrant was seen at Grinnell, Iowa, October 20; at Saint Louis, Mo., September 6; at Richmond, Kans., October 17; at Shawneetown, Ill., September 28; and at Bonham, Tex., November 11. The species became common at Richmond, Kans., November 12, and at Bonham, Tex., November 15.

Dr. Agersborg, writing of the Canada Goose in southeastern Dakota, states:

> Like the Snow Goose, it is becoming less common every year. In spring it arrives a week ahead of var. *hutchinsi,* and ten or twelve days earlier than the Snow Goose. The same order of migration is also noticed sometimes in the fall. It breeds here occasionally. The young have been hatched under hens and become very tame. I have several times been shown nests in trees, claimed by settlers to be the nests of Geese; but the "Geese" have invariably been found to be Cormorants (*Phalacrocorax dilophus*). Of the few nests of the Canada Goose found, the majority have been far away from any water, out on the prairies; but one nest was built among some large bowlders, 2 feet from the water's edge, on Lake Minnetonka, Minnesota. May not many, if not all, of the nests seen in trees by other observers have belonged to the Shag? (The Auk, Vol. II, 1885, pp. 287–288.)

172a. Branta canadensis hutchinsii (Sw. & Rich.). [594a.] *Hutchins's Goose.*

Has much the same winter range as the Canada Goose (*Branta canadensis*), but is more common in the Gulf States, and breeds only in the far North. It was reported as sometimes common at Ellis, Kans. Colonel Goss says of it in Kansas: "Migratory; abundant. A few linger into winter." In 1884 the bulk came to Vermillion, Dak., March 28. In the spring of 1885 one was shot at Gainesville, Tex., April 2.

172c Branta canadensis minima (Ridgway.) [594 b.] *Cackling Goose.*

The Cackling Goose breeds in Alaska, chiefly along the shores of Norton Sound and the lower Yukon. In winter it migrates south and southeast, sometimes reaching the Mississippi Valley. It has been killed as far east as Wisconsin.

173. Branta bernicla (Linn.). [595.] *Brant.*

Breeds within the Arctic Circle, coming south in the winter to the Mississippi Valley. During the winter of 1883–'84 this species was represented from Illinois southward by a few rare visitants. In the spring it was rare south of Minnesota, but by the time it reached that State its numbers had been increased by recruits from the southeast, and it became almost common.

There is much uncertainty in using the records concerning this species, because it is so commonly confounded with the Snow Goose, which is locally known as Brant all through the West. From the *few* records that can be depended on it would seem to have migrated at about the same time as *Branta canadensis.* At Oak Point, Manitoba, there was a large flight of Geese, given as "Brant," from May 16, to May 20, 1884.

174. Branta nigricans (Lawr.). [596.] *Black Brant.*

A bird of western Arctic America, sometimes straggling into the Mississippi Valley in winter. Mr. Lloyd states that it was shot in Tom Green county, Tex., in the winter of 1884.

177. Dendrocygna autumnalis (Linn.). [599.] *Black-bellied Tree-duck.*

A southern Duck whose northern limit is along our southern border. On the South Concho, in Texas, it is rare in fall (Lloyd). Both Dr.

Merrill and Mr. Sennett found it a rather abundant summer resident along the lower Rio Grande, in Texas. Dr. Merrill says of it:

> This large and handsome bird arrives from the south in April, and is soon found in abundance on the river banks and lagoons. Migrating at night, it continually utters a very peculiar chattering whistle, which at once indicates its presence. Called by the Mexicans *patos maizal*, or Cornfield Duck, from its habit of frequenting those localities. It is by no means shy, and large numbers are offered for sale in the Brownsville market. Easily domesticated, it becomes very tame, roosting at night in trees with chickens and turkeys. When the females begin to lay, the males leave them and gather in large flocks on sand-bars in the river. My knowledge of the breeding habits is derived from Dr. S. M. Finley, U. S. A., who had ample apportunity of observing these birds at Hidalgo. The eggs are deposited in hollow trees and branches, often at a considerable distance from water (2 miles), and from 8 to 30 feet or more from the ground. The eggs are placed on the bare wood, and are from twelve to sixteen in number. Two broods are raised, and the parent carries the young to water in her bill. The birds leave in September, but a few late broods are seen as late as November (Proc. U. S. National Museum, Vol. I, 1878, p. 169).

178. Dendrocygna fulva (Gmel.). [600.] *Fulvous Tree-duck.*

A tropical and subtropical species, coming north in summer to Texas and Louisiana. In southwestern Texas it is rather common. Near the mouth of the Rio Grande it is abundant (Merrill). Mr. Lloyd found it tolerably common in the winter of 1884 on the North Concho, in Texas. It was also given as common near the mouth of the Nueces river.

180. Olor columbianus (Ord). [588.] *Whistling Swan.*

Breeds in the far North; occurs in winter on the South Atlantic and Gulf coasts. Sometimes it winters abundantly on Galveston bay, Texas (Nehrling); and occasionally it winters in Illinois. In migration it is found in Missouri, Kansas, and northward. At San Angelo, Tex., Mr. Lloyd saw seven in January, 1884. The reports on its migration are very irregular, and all that can safely be said is that the species passed through the middle district in March, and reached Oak Point, Manitoba, May 4.

In the spring of 1885 some Swans of this species were shot in the vicinity of Saint Louis, Mo., March 24. In the fall of 1885 the last were seen at Heron Lake, Minn., November 13.

181. Olor buccinator (Rich.). [589.] *Trumpeter Swan.*

Winters abundantly and regularly on the Gulf of Mexico, and sometimes north to Illinois. Breeds from Iowa and Minnesota northward. It was reported as breeding near Newton, Iowa, and at Heron Lake, Minn., as well as along the Red River of the North. In 1884 it reached Heron Lake, Minn., April 3, and Larimore, Dak., April 15.

In the spring of 1885 Trumpeter Swans were reported from Shawneetown, Ill., March 19; Paris, Ill., March 31, and Heron Lake, Minn., April 7. A small flock, probably of this species, was seen at Mount Carmel, Mo., June 4 and 7. In the fall of 1885 it left Heron Lake, Minn., November 9. In western Texas it is tolerably common in winter (Lloyd).

182. Phœnicopterus ruber Linn. [585.] *Flamingo.*

Resident along the Gulf coast, whence reported by the most southern observers; also noted from Tom Green and Concho counties, Tex., where Mr. Lloyd found it in August, 1881, and July, 1882.

183. Ajaja ajaja (Linn.). [505.] *Roseate Spoonbill.*

A southern species, resident in the Gulf States; used to occur in the bottoms opposite Saint Louis. Mr. Nehrling states that it is common in the breeding season near Houston, in eastern Texas, and "particularly common on the prairie ponds in the northern part of Harris county."

184. Guara alba (Linn.). [501.] *White Ibis.*

An inhabitant of tropical America, coming north regularly to southern Indiana and southern Illinois (Ridgway). Dr. Agersborg shot a specimen and saw another in southeastern Dakota in May, 1879.

185. Guara rubra (Linn.). [502.] *Scarlet Ibis.*

A tropical American species. There is no record of its recent occurrence in the United States. It has been recorded from Florida, Louisiana, and Texas.

186. Plegadis autumnalis (Hasselq.). [503.] *Glossy Ibis.*

Strays less often than the last from its southern home; north only to Illinois. February 27, 1880, one was shot and two others seen at a small lake in southern Illinois, 7 miles from Saint Louis (Hurter, Bull. Nutt. Ornith. Club, Vol. VI, 1881, p. 124). Has been seen at Saint Louis, Mo.

187. Plegadis guarauna (Linn). [504.] *White-faced Glossy Ibis.*

A bird of tropical America, coming north regularly to Texas. Mr. Sennett and Dr. Merrill found a large colony breeding near Brownsville, in the valley of the lower Rio Grande, during the middle of May, 1877. It has been shot once in Kansas, near Lawrence (in the fall of 1879, Goss.).

188. Tantalus loculator Linn. [500.] *Wood Ibis.*

The Wood Ibis is a southern bird, common in all marshy localities near the Gulf coast. A few ascend the Mississippi Valley, where they have been taken in Indiana, Illinois, Missouri, Wisconsin, and Kansas. They are rare and irregular, however, and almost nothing is known of their breeding range north of the Gulf States. Though reported by the observers as occurring at various times of the year, no Ibises were noted in actual migration.

189. Mycteria americana Linn. [499.] *Jabiru.*

A tropical American bird, occurring as far north as southern Texas.

190. Botaurus lentiginosus (Montag.). [497.] *Bittern.*

A common summer resident in Manitoba and the Northern States; less common farther south. In mild winters the Bittern remains in the middle portions of the Mississippi Valley, but ordinarily it passes south of latitude 35°. It is among the first of the Herons to migrate, appearing as soon as the frost is fairly out of the marshes. The notes contributed on its northward progress were very irregular. This is due probably to the conditions of observation rather than to any erratic movements on the part of the birds. To find them the observer must go to their chosen haunts; they will not come to him.

In the spring of 1884 two sets of notes were received. Those in March gave the extension of the species to southern Minnesota by the 25th; the other set, going over the same ground, gave its arrival from the middle to the last of April and the first week in May. It is possible that both are right, there being a small flight in the latter half of March, which, after being checked by the storms of early April, was followed later by the main body. Bitterns were reported from central Minnesota May 4, and from Oak Point, Manitoba, May 15. They nest principally north of latitude 40°, but small numbers have been found in summer as far south as Mississippi, and probably a few breed throughout their range.

In the spring of 1885 thirty-five notes were contributed on the movements of this species, but they are too irregular to be of use. The extremes were: Tampico, Ill., April 8, and Shell river, Manitoba, May 4.

In the fall of 1885 the first migrants arrived at Fernwood, Ill., September 13, and were common there the next day. At San Angelo, Tex., where it is a common fall migrant, the first were observed September 4. The last was seen at Fernwood, Ill., October 10, and at Heron Lake, Minn., November 3.

191. Botaurus exilis (Gmelin). [498.] *Least Bittern.*

The range of the Least Bittern is much the same as that of the Great Bittern, excepting that it is a more southern species. It breeds from Louisiana and Texas to Minnesota. In the spring of 1884 it was somewhat later in migration and did not reach the middle districts until the first week in May.

In the spring of 1885 the first was seen at Fernwood, Ill., May 17; Emporia, Kans., and Heron Lake, Minn., May 19, being thus more than two weeks later than the Great Bittern at the same places. A nest with eggs was found at Des Moines, Iowa, May 26.

In the fall of 1885 the last was seen at Fernwood, Ill., August 29. In Tom Green and Concho counties, Tex., it is a common fall migrant (Lloyd).

Ardea wuerdemanni Baird. [486 in part.] *Würdemann's Heron.*

An inhabitant of southern Florida; accidental in southern Illinois (Mount Carmel, September 11–22, 1876. Ridgway.)

194. Ardea herodias Linn. [487.] *Great Blue Heron.*

In summer this Heron occupies suitable localities throughout the whole of the Mississippi Valley. It is rare in Manitoba. It is resident and most common in Florida and along the Gulf coast. It winters in the Southern States, and occasionally, in mild winters, a few stay in southern Illinois. In the winter of 1883–'84, there was no record north of latitude 35°. Three were seen at Caddo, Ind. Ter., February 11, flying south, but probably were not winter residents, as a reliable hunter tells me that in eight years of residence there he has only once or twice known it to occur in winter, and then in the mildest seasons. The winter of 1883–'84 was anything but mild. In the spring of 1884 the regular 'firsts' were seen at Caddo March 18, about the same time that they began to appear at stations near the Mississippi. On March 12 they came to Alton, Ill.; three days later they were noticed at Burlington, Iowa; March 21 a report came from Ferry, Iowa; they were seen at Laporte City, Iowa, March 24; at Heron Lake, Minn., April 3; and on April 6, they reached Lake City, Minn., and Green Bay, Wis.; April 20, they were reported in the west at Ellis, Kans., and Alda, Nebr.

In the spring of 1885 the notes on the Great Blue Heron were much more irregular than in 1884. It was noted March 4, at Paris, Ill., and March 7 at Shawneetown. Both of these must have been very early migrants, for, with the exception of March 17 at Richmond, Kans., no others were recorded until the last two days in March. During the week from March 30 to April 5, they were noted without any irregularity from Saint Louis, Mo.; Fayette, Mo.; Sioux City, Iowa; Heron Lake, Minn.; Elk River, Minn.; Peoria, Ill.; Aledo, Ill.; Hennepin, Ill.; Rockford, Ill.; and Durand, Wisconsin. April 15 they reached Huron, Dak.

In the fall of 1885 the first migrants appeared at Fernwood, Ill., July 26; Emporia, Kans., August 2; Mount Carmel, Mo., October 1; and Bonham, Tex., July 12. None were seen at Fernwood after July 28; or at Grinnell, Iowa, after September 28. At Mount Carmel, Mo., they were common October 3, and disappeared October 20. The last left Saint Louis, Mo., October 6. August 21 was the date of the last seen at Bonham, Tex. Mr. Lloyd states that the species is a resident in Tom Green and Concho counties, Tex.

196. Ardea egretta Gmelin. [489.] *Great White Egret.*

A more southern species than the Great Blue Heron; breeds abundantly near the Gulf in swamps and prairie ponds. The few which leave the vicinity of the sea-coast straggle up the Mississippi, even to Minnesota. The greatest wanderers are the young, which in the fall often stray *northward* into regions where the species is not known to breed. Professor Lantz has seen them at Manhattan, Kans., and there are other records for the State, but they are not known to breed within its limits. There is one record from southeastern Nebraska. In southern Illinois it is known to breed.

In 1885 two of these Egrets were killed, out of a flock of six, at Chicago, Ill., July 27. One was seen at Bonham, Tex., July 12, and eleven at the same place July 15. In the fall of 1885 numbers were present at Saint Louis, Mo., on the 15th and 16th of August. At Fernwood, Ill. the last were noted August 8; at Emporia, Kans., August 14; Saint Louis, Mo., September 11; and Bonham, Tex. August 15. "White Herons" and "Snowy Herons" were reported from Peoria, Ill., March 20; from Sioux City, Iowa, March 30, common, April 7; and from Richmond, Kans., November 3. Just which species was seen is doubtful.

197. Ardea candidissima Gmelin. [490.] *Snowy Heron; Little White Egret.*

The range of this species is much the same as that of the last. It is exceedingly abundant in the marshes near the Gulf coast. In 1884 it was reported only from Grand Ridge, Ill., where the first was seen April 19. It is resident in western Texas (Lloyd). Colonel Goss says it is not uncommon in Kansas, arriving from the south in July and August, and returning in September.

198. Ardea rufescens Gmelin. [491.] *Reddish Egret.*

A southern species, breeding in large colonies along the coast of Texas. "A summer visitant to southern Illinois, not known to breed" (Ridgway).

199. Ardea tricolor ruficollis (Gosse). [492.] *Louisiana Heron.*

An inhabitant of the Gulf States. Near Houston, in eastern Texas, it breeds in swampy woods, but is not very common (Nehrling). Along the lower Rio Grande, in Texas, it breeds abundantly (Merrill and Sennett); but Dr. Merrill thinks it passes the winter farther south. It has been reported once from Indiana (Nelson).

200. Ardea cœrulea Linn. [493.] *Little Blue Heron.*

Like the last, this species is exceedingly abundant in the marshes near the Gulf coast. It is not known to breed in Kansas, though it has been seen there in July, August, and September. The northward fall migration spoken of under the White Egret is again seen in this species. A few breed in southern Illinois, and in the fall large numbers come there from the South, making it for a time an abundant species. It rarely, if ever, occurs north of latitude 40°. I made the acquaintance of this species in the summer of 1884 at Red Rock, Ind. Ter. No nest was found, but old birds were seen every few days all summer long near a small stream. This species was not noted in 1885 by any of the observers except at Bonham, Tex. One in white phase was sent me, which had been secured there July 16. Ten birds were seen July 21, but whether in white or blue plumage was not stated. The last was seen August 24. It was recorded by Mr. Lloyd as a resident at San Angelo, Tex., where it was particularly abundant in fall migration.

201. Ardea virescens Linn. [494.] *Green Heron.*

The habitat of this Heron agrees closely with that of *Ardea herodias*, but in most places it is a more common species. Like the Great Blue Heron it breeds over all of the Mississippi Valley and remains close to the Gulf coast in winter. It migrates later, and did not appear in the middle districts until late in April. At Danville, Ill., one was seen April 21; at Saint Louis, Mo., and Des Moines, Iowa, it was noted April 26; at Manhattan, Kans., April 29; and by May 1 it had arrived over all of Illinois and Iowa, and had come to Lanesboro, Minn. At Alda, Nebr., it was seen May 3.

In the fall of 1884 the bulk departed from Des Moines, Iowa, August 26, and none were seen afterwards.

In the spring of 1885 the records of the arrival of this species were very irregular. It was recorded from Saint Louis, Mo., April 28, and Lanesboro, Minn., April 23, with much later dates scattered over the intervening country. In the fall of 1885 the last was seen at Grinnell, Iowa, September 28, and at Saint Louis, Mo., September 14. The first was seen at Emporia, Kans., October 3.

202. **Nycticorax nycticorax nævius** (Bodd.). [495.] *Black-crowned Night Heron.*

The common Night Heron breeds throughout the Mississippi Valley, and winters both on the Gulf coast and south of it. In mild winters a few have sometimes been seen in southern Illinois. In the spring of 1884 the first record came from Rodney, Miss., March 22, when they were heard squawking at night as they passed over the city. On April 5 they appeared at Laporte City, Iowa, and two days later came to Heron Lake, Minn., which is the summer home of great numbers. They also breed abundantly in a large marsh in east-central Wisconsin. Colonel Goss says they are rare in Kansas.

In the spring of 1885 the records of the Black-crowned Night Heron were very irregular, as was the case with all the other Herons. Probably the species is better known at Heron Lake, Minn., than at any other station; it arrived there April 12, and fifty were seen April 17. All the rest of the notes came from places south of Heron Lake, and were of later date, except one from Gainesville, Tex., April 10. The last was seen at Saint Louis, Mo., April 22.

In the fall of 1885 the last was seen at Grinnell, Iowa, September 28; none were reported from Richmond, Kans., after October 15, but the last did not leave Heron Lake, Minn., until November 14.

203. **Nycticorax violaceus** (Linn.). [496.] *Yellow-crowned Night Heron.*

The present species is more southern than the last, finding its northern limit in Kansas, Missouri, Illinois, and southern Indiana.

Four days after the Black-crowned Night Heron flew over Rodney, Miss., in the spring of 1884, it was followed by the Yellow-crowned (March 26).

204. **Grus americana** (Linn.). [582.] *Whooping Crane.*

Nests along our northern border, and also in central Illinois; winters along the Gulf coast and as far north as the central part of Texas, where a few flocks were seen at San Angelo by Mr. Lloyd, who tells us that the Nueces cañon is the winter home of countless myriads. "From November to the end of March these beautiful birds are exceedingly abundant on all the low prairies in the vicinity of Houston" (Nehrling). In the spring of 1884 migration began in February, and by March 5 all had left San Angelo. They arrived at Manhattan, Kans., March 18, and the last week in the month they passed through central Iowa. March 30 a good many came to Heron Lake, Minn., and May 1 they arrived at Oak Point, Manitoba.

In the spring of 1885 the Whooping Crane appeared at Emporia, Kans., March 18; Richmond, Kans., March 21; Mount Carmel, Mo., March 25; Laporte City, Iowa, March 30; Emmetsburgh, Iowa, March 23; Heron Lake, Minn., March 31; Menoken, Dak., April 5; Oak Point, Manitoba, April 15. It was common at Bonham, Tex., March 23; at Gainesville, Tex., March 31; Emmetsburgh, Iowa, April 1; Heron Lake, Minn., April 3; Menoken, Dak., April 14; and Oak Point, Manitoba, April 17. It has been known to breed at Clear Lake, Iowa. In the fall of 1885 it returned to Bonham, Tex., November 9, and large flocks were seen November 16.

205. **Grus canadensis** (Linn.). [584.] *Little Brown Crane.*

Breeds in the far North, from Hudson bay to Alaska, coming south in winter to Mexico, migrating over the Great Plains. Mr. Ridgway informs me that in the National Museum collection there is a specimen from Texas.

206. **Grus mexicana** (Müll.). [583.] *Sandhill Crane.*

The Sandhill Crane is known to breed in Florida, but was not recorded as a summer resident in Mississippi. West of the Mississippi River it breeds in Louisiana and Texas, and thence northward to Manitoba, though it is not known to breed in Indian Territory or Kansas. But at Alda, Nebr., it nested in July, 1881; and in 1882 five birds stayed there all winter. It is known to breed in Iowa, Minnesota, and Dakota. Mr. Lloyd says that in western Texas it is an abundant spring and fall migrant. Mr. Nehrling says he has "observed flocks of many hundreds on the low prairies in the western and northern parts of Harris county," in eastern Texas.

In winter it is found along the Gulf coast, from Florida to Texas. In warm winters it is found as far north as Waverly, Miss., and in Texas up to San Angelo, where a few flocks were seen. In the spring some pass north to higher latitudes, while others remain to breed.

Migration commences very early. At Yazoo City, Miss., they were seen flying north January 9 and 11; at Caddo, Ind. Ter., the first came February 26 and more flocks March 3. March 15 they came to Unadilla, Nebr.; two days later to Linwood, Nebr.; April 7 to Huron, Dak., and April 12 to Menoken and Larimore, Dak. They reached Two Rivers, Manitoba, April 15, and April 19 they were at Oak Point, Manitoba. Thus their record in the West was quite uniform and regular. Further east they appeared at Saint Louis March 16, and on the 21st and 22d were reported from four stations in central Iowa. March 24 they arrived at Storm Lake, Iowa, and the last day of the month at Heron Lake, Minn. The records east of the Mississippi were few and irregular; between March 20 and March 24 they were seen from Griggsville, Ill., to Merritt's Landing, Wis.

In the spring of 1885 all but three of the stations on the plains contributed notes on the arrival of the Sandhill Crane, while from the region east of the Mississippi river but four stations reported it. The more regular of these records are as follows: Richmond, Kans., March 11; Linwood, Nebr., March 14; Grinnell and Newton, Iowa, March 25 and 26. From March 29 to April 1 it appeared at Des Moines, Laporte City, and Emmetsburgh, Iowa; Unadilla, Nebr.; and Aledo, Tampico, and Hennepin, Ill. April 4 it was seen at Elk River, Minn.; April 7 at New Cassel, Wis.; April 12 at Menoken, Dak.; April 15 at Larimore, Dak., and Oak Point, Manitoba. In the fall of 1885 the first came to Argusville, Dak., October 2; Richmond, Kans., October 3; and Bonham, Tex., October 5. The last were seen at Richmond, Kans., November 3; Grinnell, Iowa, November 4; and Fayette, Mo., November 20.

208. Rallus elegans Aud. [569.] *King Rail.*

Winters in the southern States, occasionally north even to southern Illinois, and in summer passes up the Mississippi Valley to Kansas and Missouri regularly, and to Iowa, Minnesota, and Wisconsin occasionally. It is not common in Nebraska, and is still rarer in southeastern Dakota, where Dr. Agersborg has found it to be a rare summer resident. As in all other species of Rails, its migrations are performed at night, and during the day it keeps so secluded in the thick sedges that, though not at all uncommon in much of its range, it is rarely seen. In the spring of 1884 it appeared at Saint Louis April 10; the only other record came from one of the most northern points at which it has ever been found: Hastings, Minn., May 9.

In the spring of 1885 the King Rail arrived at Emporia, Kans., April 14, and at Aledo, Ill., April 23. It reached Heron Lake, Minn., about the middle of May, but the exact date was not recorded. In the fall of 1885 it was first noticed at Fernwood, Ill., August 29, and again September 13; the last were seen there October 13. No more congenial home for Rails can be found than the immense marshes in the vicinity of this station. Mr. Lloyd states that one was seen in South Concho, Tex., in the spring of 1886.

211. Rallus longirostris crepitans (Gmelin). [571.] *Clapper Rail.*

An inhabitant of the salt marshes of the Atlantic coast, coming north regularly to Long Island, N. Y. During the first week in June, 1886, Dr. A. K. Fisher found this form breeding commonly at Grand Isle, on the coast of Louisiana, and secured an adult male and two young, which have been examined by Mr. Ridgway and pronounced typical.

211a. Rallus longirostris saturatus Henshaw. [571a.] *Louisiana Clapper Rail.*

A southern form found on the brackish marshes near the Gulf coast of Louisiana (and Texas?).*

212. Rallus virginianus Linn. [572.] *Virginia Rail.*

Winters from the Southern States southward; breeds from northern Illinois northward; known to breed in southeastern Dakota, and in Minnesota and Manitoba. In the spring of 1884 it reached Saint Louis April 1, and by the middle of the month had reached latitude 43° 43′ in Wisconsin.

In the spring of 1885 the following records of 'firsts' were received: Paris, Ill., May 1; Mount Carmel, Mo., May 5; Lanesboro, Minn., May 12; Hennepin, Ill., April 14; Fernwood, Ill., May 10; Milwaukee, Wis., April 23.

In the fall of 1885 the first returning migrants appeared at Fernwood, Ill., September 13, and were last seen September 26.

214. Porzana carolina (Linn.). [574.] *Sora; Carolina Rail.*

Winters over the same area as the last, and also a little further north. It breeds from Kansas northward, and is an abundant summer resident in Manitoba. In southern Illinois it can be found throughout the year. In the spring of 1884 it was seen at Saint Louis April 1, at Laporte City, Iowa, April 16, and at Heron Lake, Minn., April 29. April 26 it arrived at Chicago, and the bulk came to Green Bay, Wis., May 4. The Rails, which ordinarily pass by unobserved, sometimes are suddenly and unexpectedly brought to our notice. For years they had passed to and fro over the city of Winona, Minn., unmolested and unnoticed, but in 1884 an electric light stood in their path and lured them to destruction. On the night of May 21 they were the most numerous of the many birds that were killed or wounded by striking the light-tower. Around the light they could be seen by hundreds.

In the spring of 1885 the Sora Rail was reported from San Antonio, Tex., April 5; Emporia, Kans., April 11; Des Moines, Iowa, April 22; Laporte City, Iowa, May 1; Hennepin, Ill., May 5; Fernwood, Ill., and Heron Lake, Minn., May 10; Minneapolis, Minn., May 11; and Shell River, Manitoba, May 12.

In the fall of 1885 the first migrants were seen at Fernwood, Ill., August 9; Lanesboro, Minn., August 26; Emporia, Kans., September 1; and San Angelo, Tex., September 4. The last was seen at Fernwood, Ill., September 20, and at Saint Louis, Mo., October 5. In western Texas they are rare in spring and abundant in fall (Lloyd).

[*Mr. Ridgway informs me that he inclines to the opinion that this Rail will prove to be a distinct species.—C. H. M.]

215. **Porzana noveboracensis** (Gmelin). [575.] *Yellow Rail.*

Winters in the Southern States and north to central Illinois; in summer moves up the valley to Minnesota. Has been recorded from Manitoba (Seton). Rather rare everywhere. In 1884 the only record was from Saint Louis, where the first was seen March 18.

In the spring of 1885 the Yellow Rail was seen at Fernwood, Ill., May 9, and was common the next day. It reached Elk River, Minn., May 14. A single specimen was seen at White Earth, Minn., in the latter part of June, but the exact date was mislaid. Specimens were taken at Lawrence, Kans., April 18, and October 1, 1885, by Prof. L. L. Dyche, and it was taken at Emporia, Kans., October 1.

216. **Porzana jamaicensis** (Gmelin). [576.] *Black Rail.*

Range much the same as that of the preceding, though it does not occur so far north; has been taken in Kansas, southeastern Nebraska, Iowa, and Illinois. In 1884 it was reported as breeding at San Angelo, Tex., from March 9 to June 26.

In 1885 the northward migration of the Black Rail was unnoticed by the observers, but on its return the first was seen at Emporia, Kans., September 26, and at Iowa City, Iowa., the last, October 11.

218. **Ionornis martinica** (Linn.). [578.] *Purple Gallinule.*

A southern species, occurring throughout the Gulf States and ranging north in summer to Illinois. It has been taken once at Saint Louis, Mo., and was given as a not common species on the Nueces river in Texas.

219. **Gallinula galeata** (Licht.). [579.] *Florida Gallinule.*

The Florida Gallinule breeds from the Gulf of Mexico to near our northern border. Its winter range includes all of the Southern States, where it is resident; and it occurs, according to Ridgway, up to central Illinois, but Mr. C. W. Butler, of Anna, Ill., says: "I have not found it in winter in fourteen years of collecting in the very places where Mr. Ridgway says it occurs." In its migrations it proceeds northward to Minnesota and Wisconsin in the East, and Kansas and Nebraska in the West. Near Ripon, Wis., it outnumbers the Coot, and its breeding habits until a few years ago could be studied to the best advantage, but persecution has made it wild, and now it hides at the slightest sound. The only record of its arrival in 1884 came from Saint Louis, where it appeared May 11.

In 1885 but one record of the Florida Gallinule was received: its arrival at Des Moines, Iowa, May 26.

221. **Fulica americana** Gmelin. [580.] *Coot.*

Range in winter the same as that of the Florida Gallinule, but in summer it goes far into British America. It breeds throughout its range, and records of breeding in 1884 were received from various places, all the way from Eagle Pass and San Angelo, Tex., to Ossowa, Manitoba. It must breed early in southern Texas, for Mr. Negley says that at Eagle Pass, March 16, he caught a young Water Hen about two weeks old. At San Angelo Mr. Lloyd did not find young until May 18. In the spring of 1884 migration at Moss Point, Miss., commenced in February, after which no movement was noted until March 24 to March 26, when Coots were recorded simultaneously from Saint Louis, Mo., to Red Wing, Minn. In the West, they were noted from Ellis, Kans., and Alda, Nebr., April 4 and 9, and at the same time at Chicago. The only Wisconsin record was the arrival of the bulk May 4 at Green Bay. May 6 it came to Portage la Prairie, Manitoba, and May 9 it appeared at Oak Point, Manitoba. In the fall of 1884 the first migrants were reported from Emporia, Kans., September 20.

In the spring of 1885 the more regular of the notes contributed on the migration of this species are the following: Fayette, Mo., first seen March 15; Emporia, Kans., March 17; Fernwood, Ill., March 31; Heron Lake, Minn., April 1; Laporte City, Iowa, April 2; Durand, Wis., April 20; Ossowa, Manitoba, May 4.

In the fall of 1885 it arrived at Lanesboro, Minn., September 4, and at Emporia, Kans., September 19. The last was seen at Heron Lake, Minn., November 9.

222. Crymophilus fulicarius (Linn.). [563.] *Red Phalarope.*

Breeds in the far North, coming South in winter to the northern half of the Mississippi Valley. Has been recorded from Illinois (Nelson), and Minnesota (Hatch).

223. Phalaropus lobatus (Linn.). [564.] *Northern Phalarope.*

Breeds in the far North, and is a rare migrant through the Mississippi Valley. It is known from Illinois, Kansas, Minnesota, and Manitoba; and was reported by the observers at Saint Louis, Mo., and Alda, Nebr.

224. Phalaropus tricolor (Vieill.). [565.] *Wilson's Phalarope.*

This is the most common of the three Phalaropes, and it is more abundant in the Mississippi Valley than elsewhere. It does not winter in the Mississippi Valley, but breeds quite commonly in the northern parts and in Manitoba. In 1884 it was reported as breeding in Illinois, Iowa, Minnesota, and Dakota; and it has been known to breed in Nebraska and in western Kansas. May 8 a pair arrived at Vermillion, Dak.; May 17 it was already breeding at Polo, Ill.

In the spring of 1885 it was noted during northward migration at San Angelo, Tex., May 15; at Gainesville, Tex., May 6; Emporia, Kans., April 23; Manhattan, Kans., May 9; and Menoken, Dak., May 12.

In the fall of 1885 the first returned to Emporia, Kans., August 31, and the last was seen at Lanesboro, Minn., September 13. Mr. Lloyd states that in western Texas it is tolerably common in spring, but is not found in fall.

225. Recurvirostra americana Gmelin. [566.] *Avocet.*

During migration the Avocet occurs throughout the Mississippi Valley. East of the Mississippi it breeds from Illinois northward, and in the West even as far south as Mason, Tex., where Mr. Henry found it to be a rare summer resident. Dr. Merrill states that a few pairs remain to breed along the Lower Rio Grande. It winters along the Gulf coast and southward. In migration in 1884 it was seen at Emporia, Kans., May 11, and at Alda, Nebr., May 2. In the fall of 1884 the first Avocet appeared at Emporia, Kans., August 25.

In 1885 no notes were received on its spring migration. In the fall it reached San Angelo, Tex., September 4. In this locality it is a common fall migrant.

226. Himantosus mexicanus (Müll.). [567.] *Black-necked Stilt.*

A common resident along the coast of Texas; in summer distributed locally and rarely over the better watered portions of the Mississippi district. Has been taken in Texas, Illinois, and Minnesota, and was recorded from Kansas by Col. N. S. Goss, on the authority of W. H. Gibson, who saw three in June, 1881, near the Arkansas river, at Lakin, Kans.

228. Philohela minor (Gmel.). [525.] *Woodcock.*

Breeds principally from the middle districts northward, but a few remain in summer throughout the Southern States; rare in Manitoba. It winters wherever it can find unfrozen ground suitable for its wants; hence it is limited principally to the Gulf States during the cold weather, but a few usually spend the winter at Corinth, Miss., and in southern Illinois. Both stations in southern Louisiana report that the number present in winter depends on the weather to the northward. If the winter is severe, they arrive in great numbers, but in mild winters are scarce. In the winter of 1883–'84 they were abundant. By the middle of February almost all had left the State. In the West the Woodcock winters in Kansas, Indian Territory, and occasionally in western Texas. It was reported from San Angelo, Tex., that a few are some times seen there in winter. In the spring of 1884 it reached Chicago March 22, and Portage la Prairie, Manitoba, April 25.

In the fall of 1884, about September 15, I flushed a Woodcock near a small spring in the central portion of Kansas City, Mo. At Mount Carmel, Mo., the last was seen October 23.

In the spring of 1885 it was first seen at Shawneetown, Ill., March 4; Fernwood, Ill., April 1; Lanesboro, Minn., April 21; and Oak Point, Manitoba, May 13. At Shawneetown, Ill., numbers were found in a low, flat bottom along the Ohio river July 25, and a few were seen afterwards. In the fall of 1885 the last were seen at Fernwood, Ill., October 10, and at Shawneetown November 14.

230. Gallinago delicata (Ord). [526^a.] *Wilson's Snipe.*

Breeds chiefly from the Northern States northward; an abundant migrant in the Mississippi Valley; winter range extending to South

America. During the winter of 1883-'84 Wilson's Snipe was not reported from farther north than latitude 33°, but in suitable localities, which, of course, are not common, it remains regularly as far north as southern Illinois, and one case is on record of its wintering in company with Teal and Mallard on the margin of a hot spring in Wyoming. In the winter of 1883-'84 a few were seen at Ellis, Kans., in December, after the creek was newly frozen over. They were late migrants. The great bulk breed in British America, but a few have been known to nest in northern Illinois, and Mr. Lloyd gives it as a resident at San Angelo, Tex., but says he never has found the nest. A few also breed at Heron Lake, in southwestern Minnesota. In western Manitoba it is a common summer resident (Seton).

In the spring of 1884 migration commenced during the latter part of February. February 19 Snipe began to move through Eagle Pass, Tex., where Mr. Negley says they remained one week only. February 29 they had begun to leave southern Louisiana, though the bulk did not leave until the second week in March. They arrived at Caddo, Ind. Ter. (lat. 34° 11′), March 8, and on the 12th and 13th reached Odin, Ill., and Saint Louis, Mo. (lat. 38° 40′). During the rest of March there was no record from Iowa, but in Illinois they were reported up to Chicago. April 5 to 7 they advanced to central Iowa and southern Wisconsin, and by April 15 had reached latitude 44° 45′ in Wisconsin, and latitude 44° 15′ in Dakota, but no record came from Minnesota until the next week. They were recorded from Argusville and Larimore, Dak. (lat. 47° 52′), during the first week in May. This Snipe is not a rapid migrant. The bulk moves about two weeks behind the van, and even in those places where it does not breed it can generally be found from four to six weeks. In the fall of 1884 the first migrating Snipe reached Emporia, Kans., August 30.

In the spring of 1885 it appeared at Corinth, Miss., February 12, and was seen for the second time February 20. It reached Shawneetown, Ill., February 27; Saint Louis, Mo., March 11, and Emporia, Kans., March 14. For the next ten days the cold was too severe for migration, and very little progress seems to have been made in the remainder of the month. During the first five days of April it was noted from Ellsworth, Kans., Fayette, Mo., Des Moines, Iowa; and Paris, Aledo, Hennepin, and Fernwood, Ill. At Hennepin it had also been noticed March 25. It came to Emmetsburgh, Iowa, April 14; Milwaukee, Wis., April 15; Heron Lake, Minn., April 19; Luck, Wis., and Ossowo, Manitoba, May 2; and Shell River, Manitoba, May 4. At Corinth, Miss., the last was seen April 9, and at Mount Carmel, Mo., April 20; while at Bonham, Tex., it did not leave until April 30, and one was taken at San Antonio, Tex., May 27. In the fall of 1885 the last was seen at Heron Lake, Minn., November 14; Fernwood, Ill., November 13; and at Fayette, Mo., November 1. The first migrant appeared at Fernwood, Ill., August 29; at Emporia, Kans., September 3; Saint

Louis, Mo., October 10; and at Bonham, Tex., November 3. The bulk arrived at Saint Louis, Mo., October 16, and the species was still there November 3.

231. Macrorhamphus griseus (Gmelin.) [527.] *Dowitcher; Red-breasted Snipe.*

A bird of eastern North America, breeding far North, and migrating chiefly in the Atlantic region. A few sometimes migrate through the Mississippi Valley, where they have been taken in Illinois. But the common Dowitcher of the Mississippi Valley is the following species, *Macrorhamphus scolopaceus*, under which all the migration records have been placed, though it is impossible to say that none of them belong to the present species.

232. Macrorhampus scolopaceus (Say). [527^{a}.] *Long-billed Dowitcher.*

Winters from the Gulf coast southward; migrates through the Mississippi Valley, and breeds in British America. Colonel Goss says it is a common migrant in Kansas. But few records of its movements were received. In 1884 its arrival in central Texas was noted March 15, and in southern Minnesota the last of April, while the bulk reached Vermillion, Dak., the first week in May.

In the spring of 1885 the only records received were of its arrival at Paris, Ill., April 5; Mount Carmel, Mo., April 26, and Emporia, Kans., May 1.

233. Micropalama himantopus (Bonap.). [528.] *Stilt Sandpiper.*

Rather a rare bird in the Mississippi Valley, where it occurs during its passage from its winter home to its breeding grounds in the far North. It was not noticed during the spring migration in 1884 or 1885. On its return in 1885 it was shot at Lanesboro, Minn., August 20, and at San Angelo, Tex., September 3. At the latter place it was common during the fall migration.

234. Tringa canutus Linn. [529.] *Knot; Robin Snipe.*

Breeds within the Arctic Circle; in migration abundant along the Atlantic coast, but rare in the Mississippi Valley. Noted from Manitoba, Kansas, Nebraska, and Illinois; and has been taken once by Dr. Hvoslef, at Lanesboro, Minn., this being the first record for that State.

235. Tringa maritima Brünn. [530.] *Purple Sandpiper.*

A northern species, migrating southward in winter, chiefly along the Atlantic coast; found rarely on the Great Lakes. It was killed on Lake Michigan, near Chicago, November 7, 1871. (Nelson, Bull. Essex Inst., Vol. VIII, p. 127.)

239. Tringa maculata Vieill. [534.] *Pectoral Sandpiper; Jack Snipe.*

Breeds in the far North. A common and well-known migrant, from the Gulf of Mexico to Manitoba. In the spring of 1884 it seems to have been overlooked, since it was reported only from Saint Louis, March 17. A "Jack Snipe" was reported from Oak Point, Manitoba, April 22.

In the spring of 1885 the Pectoral Sandpiper was common in the Saint Louis market March 26. At San Angelo, Tex., the first was seen April 27; it was common there the next day, and left May 15. At Emporia, Kans., the first came May 1, and it became common May 4. Dr. Langdon states that in West Baton Rouge parish, La., in the spring of 1881, it was common from March 23 to April 10. (Journ. Cin. Soc. Nat. Hist., Vol. IV, 1881, p. 154.)

240. **Tringa fuscicollis** Vieill. [536.] *White rumped Sandpiper.*

Breeds in the high North, and occurs in winter from the Gulf of Mexico to southern South America, migrating through the Mississippi Valley. Colonel Goss states that it is a common migrant in Kansas. It has been seen also in Dakota, though rarely, and was noticed at Des Moines, Iowa, March 31, 1884. In Manitoba, large flocks were seen near Shoal lake, June 4, and on Duck mountain, June 8, 1884 (Seton).

In the spring of 1885 the only note contributed on the migration of the White-rumped Sandpiper was the record of its arrival at Emporia, Kans., May 4.

241. **Tringa bairdii** (Coues). [537.] *Baird's Sandpiper.*

Breeds along the Arctic coast and winters in South America; rather common during migration in Kansas and Nebraska, and has been taken in former years at West DePere, Wis. At Emporia, Kans., it was seen March 27, 1884, and was common March 31. In the fall it reappeared August 25. In the spring of 1885 it was seen at San Angelo, Tex., May 15. At this locality it is a common spring and fall migrant.

242. **Tringa minutilla** Vieill. [538.] *Least Sandpiper.*

Breeds in the far North and winters from the Gulf of Mexico southward. One of the commonest of its family during its migrations through the Mississippi Valley. Mr. Nehrling says it is not uncommon in winter in eastern Texas, near Houston. In the spring of 1884 it came to Caddo, Ind. Ter., about March 10; passed on to Alda, Nebr., by April 10; and April 25 had appeared at Oak Point, Manitoba, thus averaging more than 25 miles a day.

In the spring of 1885 the record of the northward migration of the Least Sandpiper was regular compared with that of the other shore birds. It appeared at San Angelo, Tex., April 18; at Gainesville, Tex., May 6; Emporia, Kans., May 8; Saint Louis, Mo., May 12; Minneapolis, Minn., May 12, and Huron, Dak., May 13. At San Angelo the last was seen May 16. In the fall of 1885 the first returned to Emporia, Kans., August 6, where it became common August 31. It reached San Angelo, August 25, and was last seen at Saint Louis, Mo., August 31. Dr. Agersborg says he has seen it in southeastern Dakota during the whole summer, but has not found its nest.

243*a*. **Tringa alpina pacifica** (Coues). [539*a*.] *Red-backed Sandpiper.*

Breeds far north; very rare throughout most of the Mississippi Valley during migration. In the spring of 1884 it was taken at Gainesville, Tex., March 15, and was mentioned as common in Minnesota and Manitoba.

In 1885 the only record of the Red-backed Sandpiper was a note on its appearance at Emmetsburgh, Iowa, April 15.

Dr. Merrill states that near the mouth of the Rio Grande, May 16, 1877, he "found the Red-backed Sandpiper rather common about some lagoons in the salt marshes; the males were in full breeding plumage." (Proc. U. S. Nat. Mus., 1878, p. 161.)

246. Ereunetes pusillus (Linn.). [541.] *Semipalmated Sandpiper.*

A migrant in the Mississippi Valley. In the spring of 1884, it was noticed by two observers only; at Ellis, Kans., it was seen April 5, and at Iowa City, Iowa, May 3.

In the spring of 1885 the Semipalmated Sandpiper was noticed at Gainesville, Tex., May 6; at Emporia, Kans., May 9, and Huron, Dak., May 13. At Emporia the last was seen May 27. A skin of this species was sent me for identification from Bonham, Tex., where it had been taken April 18.

In the fall of 1885 the first came to Lanesboro, Minn., August 21; to Emporia, Kans., August 31. It was last seen at Saint Louis, Mo., August 31.

247. Ereunetes occidentalis Lawr. [541^a.] *Western Sandpiper.*

An inhabitant of the western province of North America; breeding in the far North. Mr. Lloyd states that in Tom Green and Concho counties, Texas, it is "common in spring and fall, arriving in spring, April 10 to May 12; in the fall, from September 4 to October 20."

248. Calidris arenaria (Linn.). [542.] *Sanderling.*

Breeds in the high North; in migration one of the rarest of the family in the Mississippi Valley, but common along the sea-coast. Has been reported from Lawrence, Kans., and from Missouri, Illinois, Minnesota, and Manitoba. In winter and early spring it is common along the coast of Texas (Merrill and Sennett).

249. Limosa fedoa (Linn.). [543.] *Marbled Godwit.*

A common summer resident in Manitoba; also breeds within our border. In June, 1879, it was found breeding abundantly in the Traverse Lake region, in western Minnesota (Roberts and Benner, Bull. N. O. C., Vol. V, 1880, pp. 13, 18). It was reported by Mr. Preston as breeding at Clear Lake, Iowa, and is known to breed in Nebraska, Dakota, and Minnesota (and perhaps also in Texas). It is not known to breed in Kansas. In southeastern Texas it is a spring and fall migrant.

In the spring of 1885 about twenty birds of this species were seen at Huron, Dak., May 3.

251. Limosa hæmastica (Linn.). [545.] *Hudsonian Godwit.*

A migrant in our district; has been noted from a few localities only.

Though generally considered a rarer bird than the preceding, Dr.

Agersborg gave it as more common—indeed, as an abundant species during migration in southeastern Dakota. In 1884 the bulk arrived at Vermillion, Dak., May 3. In 1885 a flock of twenty-five was seen at Emporia, Kans., May 8.

254. **Totanus melanoleucus** (Gmelin). [548.] *Greater Yellow-legs.*

Breeds from the Northern States northward, and occurs in thousands along the Gulf coast in winter. In 1884 migration commenced early in March. March 11 it was seen at Caddo, Ind. Ter.; the next day at Alton, Ill., and during the last week of March it was reported from Manhattan, Kans., and Newton and Laporte City, Iowa. During the first week of April it appeared at Alda, Nebr., and Polo, Ill.; southern Minnesota was reached April 19, and southeastern Dakota two days later. May 4 it was reported from Menoken, Dak., and about May 12 it reached Portage la Prairie, Manitoba. This species was still abundant in southern Louisiana March 12, but left soon after. It has been seldom found breeding in the United States, but has been so noted from northern Illinois, and from Heron Lake, Minn., where it is a common summer resident. In the fall of 1884 the first migrant appeared at Emporia, Kans., October 12.

In the spring of 1885 it appeared at Gainesville, Tex., March 11; Saint Louis, Mo., March 26; Emporia, Kans., March 27; Sioux City, Iowa, April 12; Heron Lake, Minn., April 12; Des Moines, Iowa, April 16; Fernwood, Ill., and Lanesboro, Minn., April 20; and Shell River, Manitoba, April 24.

In the fall of 1885, 'firsts' were noted from Lanesboro, Minn., September 7; Milwaukee, Wis., August 17; Emporia, Kans., August 12; and San Angelo, Tex., September 4. At Lanesboro, Minn., the last was seen October 23.

255. **Totanus flavipes** (Gmelin). [549.] *Yellow-legs.*

The movements of this species are much the same as those of its larger congener, with which it is often found. Like the Greater Yellow-legs, it is a common summer resident at Heron Lake, Minn., and has been found breeding in northern Illinois. Its times of migration agree very closely with those of the last.

In the fall of 1884 the first flock of Yellow-legs appeared at Emporia, Kans., September 13.

In the spring of 1885 but few notes were received on the movements of this species. It reached Shell River, Manitoba, in company with the Greater Yellow-legs, April 24. In the fall of 1885 the returning flocks were first noted at Emporia, Kans., August 12.

256. **Totanus solitarius** (Wils.). [550.] *Solitary Sandpiper.*

A common migrant throughout most of the Mississippi Valley; breeds from Illinois northward, and probably also in Kansas and Nebraska. In 1884 it appeared at Gainesville, Tex., March 14; and at Des Moines, Iowa, April 26. At Saint Louis, Mo., the first record was May 5 and the last May 22.

In the spring of 1885 no records were received of the movements of the Solitary Sandpiper from any point south of Emporia, Kans., where it arrived April 23. The next day it was seen at Saint Louis, Mo., and Aledo, Ill.; May 2 at Manhattan, Kans.; May 3 at Huron, Dak.; May 4 at Des Moines, Iowa, and May 9 at Lanesboro, Minn. At Saint Louis, Mo., the last was noted May 12.

In the fall of 1885, it was seen for the last time at Fernwood, Ill., September 26, and at Saint Louis, Mo., September 25. It had appeared at San Angelo, Tex., September 7. Dr. Agersborg says it is very rare in southeastern Dakota. Mr. Lloyd says that in western Texas it is tolerably common in September, but rare in spring.

Symphemia semipalmata inornata Brewster. [552 in part.] *Western Willet.*

Breeds from the Gulf States northward. Occurs during migration throughout the Mississippi Valley, and, unlike the previously mentioned members of the family, does not proceed far northward. Near Houston, in eastern Texas, it is a common resident (Nehrling). It breeds throughout Illinois, and Mr. Preston reported it as a rare breeder near Newton, Iowa. In Kansas and southern Dakota it was marked as a rare migrant in the spring of 1884, the bulk arriving at the latter place May 3. In northern Dakota and western and northwestern Minnesota it breeds abundantly. It was seen at Chicago, Ill., May 13, though of course this record must not be considered that of first arrival.

In the spring of 1885 but two records were received of the movements of the Willet. It arrived at Emporia, Kans., May 2, and at Heron Lake, Minn., May 10. (For the description of this recently separated subspecies, see the Auk, Vol. IV, No. 2, April, 1887, pp. 145–147).

261. Bartramia longicauda (Bechst.). [555.] *Bartramian Sandpiper; Field Plover.*

The Upland Plover is common throughout our district, and breeds from Kansas and Illinois northward. Usually it is thought not to winter in the United States, but Mr. Lloyd shot one at San Angelo, Tex., in January, 1883. In the spring of 1884 migration commenced early in March, and the van reached Saint Louis March 17. March 25 and 26 it was reported from Ellis, Kans., Storm Lake, Iowa, and Tampico, Ill. There was evidently a halt called when the storms of April commenced, and no further advance occurred until April 14, with the exception of some stragglers at Linwood, Nebr. On that day and the next it appeared at Polo, Ill., Laporte City, Iowa, and Unadilla, Nebr. During the rest of April it passed on to latitude 45° in Minnesota, and to Vermillion, Dak., latitude 42° 56. Upland Plover were seen at Barton and Huron, Dak., May 4 and 5; at Argusville, Dak. (lat. 47° 8′), May 10; and at Menoken, Dak. (latitude 46° 58′), May 1; these last must have been stragglers. At Red Rock, Ind. Ter., they were constantly seen and heard all summer, so that although no nests were found they may be put down as summer residents in the Territory. During the spring thousands passed over, reminding one strongly of the great flocks of Passenger Pigeons seen in Wisconsin and Minnesota.

In the fall of 1884 the first Field Plover appeared at Abbeville, La., August 1, where the species became common August 4.

In the spring of 1885 the migration was about two weeks later than in 1884. The first appeared at Abbeville, La., March 20; at Bonham and Gainesville, Tex., March 28; at Saint Louis, Mo., and Odin, Ill., April 2; Hennepin, Ill., April 5; Emporia, Kans., April 7; and from April 10 to 15 at Manhattan, Kans., Unadilla and Linwood, Nebr., Grand View, Dak., Newton, Grinnell, and Emmetsburgh, Iowa, and Aledo, Ill. From April 20 to 23 it was seen at Stoughton, Lake Mills, and Leeds Centre, Wis.; April 27, at Huron, Dak. (two observers); April 28 at Heron Lake, Minn., and May 4 at Menoken, Dak., and Shell River, Manitoba.

In fall migration in 1885 it was very common at San Angelo, Tex., July 7, and was last seen at Bonham, Tex., September 2.

262. Tryngites subruficollis (Vieill.). [556.] *Buff-breasted Sandpiper.*

A rather rare and very irregular migrant in the Mississippi Valley. Dr. Agersborg states that it is an abundant spring migrant in southeastern Dakota; and Dr. A. K. Fisher tells me that in August, 1874, he saw hundreds of Buff-breasted Sandpipers on the dry prairie at Maywood, Cook county, Ill., only 10 miles from Chicago, and that he shot numbers of them.

In the spring of 1884 a flock was seen at Gainesville, Tex., May 5. (For additional remarks on its occurrence in Texas see Bull. Nutt. Ornith. Club, Vol. VI, 1881, pp. 61, 62.)

263. Actitis macularia (Linn.). [557.] *Spotted Sandpiper.*

An abundant migrant in most parts of the Mississippi Valley. Breeds commonly in Manitoba, and many stop to breed all along their course, after wintering in the southern States. April 23 and April 26 it appeared at Manhattan, Kans., and Saint Louis, Mo. The next two days it was found in southern Minnesota and northern Illinois. At Alda, Nebr., it arrived May 2, and at Portage la Prairie, Manitoba, May 5.

In the fall of 1884 the last Spotted Sandpiper left Des Moines, Iowa, September 17.

In the spring of 1885 the notes were very irregular. The first was seen at San Angelo, Tex., March 9; at Paris, Ill., and Lanesboro, Minn., April 23; Des Moines, Iowa, April 24; Manhattan, Kans., and Iowa City, Iowa, May 2; and Minneapolis, Minn., May 11.

In the fall of 1885 the last was seen at Lanesboro, Minn., October 22.

264. Numenius longirostris Wils. [558.] *Long-billed Curlew.*

Occurs over the whole of the Mississippi Valley, and is known to breed throughout most of its range. It winters in the southern States, where it is resident, and occasionally is found in winter in southern Illinois. Colonel Goss states that in Kansas it is a rare summer resident, but a common migrant. Mr. Lloyd says that in Texas it winters in Concho county, but not in Tom Green county. It migrates early, and March 11, 1884, at Darlington, Ind. Ter., hundreds were seen in three flocks. For a few days it flew east and northeast at night, and in the opposite direction in the morning. April 3 it reached Alda, Nebr., and two days later Vermillion, Dak.; April 16 it reached Argusville, Dak., and April 24 Menoken, Dak. By May 4 it had come to Larimore, Dak.; and May 9 was reported from Oak Point, Manitoba. It passed Saint Louis April 1, and through central Iowa April 15.

During the winter of 1884–'85 the Long-billed Curlew remained at Eagle Pass, Tex., where it was seen January 7 and February 9.

In the spring migration of 1885, from April 10 to April 15, it was noted at Emporia, Kans.; Emmetsburgh, Iowa; Heron Lake, Minn.; Grand View, Dak., and Huron, Dak. It reached Larimore, Dak., April 26. In the fall of 1885, the returning flocks appeared at Emporia, Kans., August 5, and at San Angelo, Tex., August 20. At Fernwood, Ill., the last were seen October 13.

265. **Numenius hudsonicus** Lath. [559.] *Hudsonian Curlew.*

A common migrant in most parts of the Mississippi Valley, wintering in the Southern States. Rare in Kansas (Goss). It does not breed within our limits. The only record received came from Heron Lake, Minn., May 1, 1884.

266. **Numenius borealis** (Forst.). [560.] *Eskimo Curlew.*

The most abundant of the three Curlews. Migrates through the Mississippi Valley in immense numbers, but does not stay to breed or to winter. In the spring of 1884 the first came to Saint Louis, Mo., and to Caddo, Ind. Ter., March 25, and the prairies were fairly alive with them at Caddo, April 2. On the same day they were noted from Wise county, Tex., and Alda, Nebr. April 3 found a few at Heron Lake, Minn., and the bulk arrived at Vermillion, Dak., May 3.

In the spring of 1885 the first Eskimo Curlew appeared at Gainesville, Tex., March 7; one was found in the Saint Louis market April 6; they reached Emporia, Kans., April 13, and Heron Lake, Minn., April 24.

270. **Charadrius squatarola** (Linn.). [513.] *Black-bellied Plover.*

This species is more numerous along the coast of the United States than it is in the interior, but it has been found throughout the Mississippi Valley and in Manitoba during its migrations. It breeds in the far North. In most of the State lists it is marked rare, but we have several records of its occurrence in anything but small numbers. The most interesting came from Alda, Nebr., whence Mr. Powell writes: "In southeastern Nebraska it is usually rare, but May 21, 1883, I saw thousands of them on the Platte river. The weather had been rainy for a few days before I saw them, with the wind from the south, but on that day the wind blew stiff from the north, with broken clouds flying, and the air pretty cold. The birds were on the hay-flats on the south side of the river. I drove up the valley seven or eight miles, and was not out of sight of large flocks any of the time. They were wild and I killed only three."

In the spring of 1884 there was no regularity in the notes on this species, and probably the fault was in the birds. At Polo, Ill., the first was seen April 30, and the day before at Heron Lake, Minn., they were found in flocks which stayed about two weeks. At Alda, Nebr., a good many passed over during the nights of April 25 and 27. On April 16, flocks of thousands were seen at Argusville, Dak., and the bulk was given as arriving at Vermillion, Dak., May 5.

In the spring of 1885 the first Black-bellied Plover was seen at Hennepin, Ill., April 2; at Heron Lake, Minn., April 24; and at Huron, Dak., May 5. The last at Hennepin, Ill., was seen May 3.

272. Charadrius dominicus Müll. [515.] *Golden Plover.*

Breeds in the Arctic regions, and occurs in migration throughout the Mississippi Valley and Manitoba. In the spring of 1884, at Caddo, Ind. Ter., the first came about March 11; between March 21 and 27, it was noted from latitude 39° in Missouri to latitude 41° 42′ in Iowa, and to Chicago, Ill. Then no more records were made until after the April storms. About April 16, it began to move again, and April 24 it was reported from Unadilla, Nebr., and Leeds Centre, Wis.; April 29 it reached Heron Lake, Minn., and the first week in May was reported from Argusville and Larimore, Dak. In southeastern Dakota it is very abundant during migration.

In the fall of 1884 the first Golden Plover was seen at Emporia, Kans., October 22; and at San Angelo, Tex., where it was reported as a winter visitant, flocks of hundreds were seen in November.

In the spring of 1885 the van reached Gainesville, Tex., March 17. They were found in the Saint Louis market March 26, and the same day were seen at Odin, Ill., and Richmond, Kans. At Hennepin, Ill., a flock was seen March 31. They came to Des Moines, Iowa, April 16; Fernwood, Ill., April 25; Heron Lake, Minn., and Argusville, Dak., May 4. The last at Richmond, Kans., was seen May 8.

In the fall of 1885 the first was noted from Fernwood, Ill., July 15; no more until August 3; common August 20; disappeared October 12.

Dr. F. W. Langdon states that in West Baton Rouge parish, La., in the spring of 1881, Golden Plover "frequented the pastures and stubble-fields from April 2 to 15, in flocks numbering from a dozen to twenty individuals." (Jour. Cin. Soc. Nat. Hist., Vol. IV, 1881, p. 154.)

273. Ægialitis vocifera (Linn.) [516.] *Killdeer.*

Breeds throughout the Mississippi Valley and Manitoba; an abundant winter resident along the coast, and for 100 miles inland; less common north to latitude 35°; and only occasional up to southern Illinois. In Texas it does not ordinarily winter north of latitude 33°. This is the first plover to move northward, usually keeping but a few days behind the Ducks, Blackbirds, and Robins. In the spring of 1884 Killdeer commenced their journey as usual in the latter part of February, but did not make much progress during that month. A single one was seen at Caddo, Ind. Ter., February 22, but it was a week later before the general advance began. At San Angelo, Tex., Mr. Lloyd's report states: "Although many stay here all winter, they have been arriving in great numbers since March 1, and will breed in a week or so." Fresh eggs were found at Eagle Pass, Tex., March 18, and at San Angelo from March 9 to June 24. This wave of March 1 reached Gainesville, Tex., and Caddo, Ind. Ter., March 5 and 6, making the species quite common; but the bulk did not arrive until March 11, by which time the first had traveled to Saint Louis, Mo.; Odin, Ill.; Ellis, Kans.; and Manhattan, Kans. Here then we have the van of migration stretching in an almost straight line due east and west for 700 miles. The northern limit of the area over which the Kildeer wintered is a line curving southward as it passes to the west, but the first spring wave started earlier in the West than near the Mississippi, and by March 11 they were even all along the line. From here the advance in Illinois took place March 13, and a corresponding advance in Iowa March 16 to latitude 42°. March 23 and 24 there was an advance all along the line to latitude 43° 47′ in eastern Wisconsin; to latitude 45° in Minnesota and western Wisconsin near the Mississippi; to latitude 43° 48′ in western Minnesota, and up the Missouri river to latitude 42° 56′ in Dakota. Continuing northward in the West, they were observed at latitude 44° 21′ in Dakota on March 27, and April 14, had passed on up the Missouri to Menoken, Dak., latitude 46° 58′. April 23 they were at Portage la Prairie, Manitoba.

In the fall of 1884 the last Kildeer left Des Moines, Iowa, August 15. At Mount Carmel, Mo., the first migrant was seen August 30, and the last October 1.

In the spring of 1885 the record began with two irregular occurrences: February 28 it was reported from Richmond, Kans., and Odin, Ill. The regular advance was as follows: Corinth, Miss., March 1; Saint Louis, Mo., and Ellsworth, Kans., March 2; Shawneetown, Ill., March 4; Paris, Ill., March 5; Glasgow, Mo., March 10; Unadilla, Nebr., March 11; Ferry, Iowa, March 12. And on March 14 it appeared at Des Moines, Laporte City (two observers) and Newton, Iowa, and at Tampico (two observers) and Hennepin, Ill. From March 25 to 26 a slight advance was made to Batavia, Ill., Delavan, Wis., and Emmetsburgh, Iowa. March 31 and April 1 the Kildeer, with thousands of other birds, made a long journey, appearing at Clinton, Milwaukee, Lake Mills, Leeds Centre, New Cassel, and New Richmond, Wis.; Heron Lake, Minn., and Huron, Dak. (two observers). It was reported April 4 at Argusville, Dak., and April 17 at Oak Point, Manitoba.

In the fall of 1885 the last was seen at River Falls, Wis., September 29; at Fernwood, Ill., September 10; at Grinnell, Iowa, October 17; and at Iowa City, Iowa, October 24. The first migrant reached Bonham, Tex., November 3; the next, November 4, and it had become common by the 11th.

274. Ægialitis semipalmata Bonap. [517.] *Semipalmated Plover.*

Winters from the Gulf coast and Texas southward, and passes up the Mississippi Valley during April and May, to breed in the far North.

No dates of its migration were given in 1884.

In the spring of 1885 the only note on the northward migration of the Semipalmated Plover was that of its arrival at Emporia, Kans., April 25, at which place it was common April 30. On its return it was noted at Huron, Dak., September 1, and at Lanesboro, Minn., September 3.

277a. Ægialitis meloda circumcincta Ridgw. [520*a.*] *Belted Piping Plover.*

This is the form of the Piping Plover which inhabits the Mississippi Valley, wintering south of our border, and breeding abundantly from northern Illinois and Nebraska northward to Lake Winnipeg. It is not yet known from Kansas. It was reported as breeding at Grinnell, Iowa, but was not noted during migration.

278. Ægialitis nivosa Cass. [521.] *Snowy Plover.*

A bird of the western province of North America, recently added to our district by Col. N. S. Goss, who, in June, 1886, found it breeding plentifully on the salt plains along the Cimarron river in Indian Territory and southern Kansas. Still more recently, Mr. Sennett has procured it from southern Texas.

280. Ægialitis wilsonia (Ord). [522.] *Wilson's Plover.*

A southern species, breeding along the South Atlantic and Gulf coasts; abundant along the coasts of Texas and Louisiana. Not known from the interior.

281. Ægialitis montana (Towns.). [523.] *Mountain Plover.*

Inhabits the western portion of our district from western Texas to western Dakota; breeds from Kansas northward. Mr. Lloyd says that at San Angelo, Tex., it is common in spring and fall, and that some remain through the winter. Mr. Brown took it at Boerne, Tex. At Ellis, Kans., it is a regular summer resident and is common.

283. Arenaria interpres (Linn.). [509.] *Turnstone.*

A bird of wide distribution. Breeds along the coast of Texas. Its home is on the sea-coast, but it sometimes wanders into the interior, and has been taken in Manitoba, Minnesota, and along Lake Michigan. It was reported as an accidental visitant at West De Pere, Wis.

286. Hæmatopus palliatus Temm. [507.] *Oyster-catcher.*

Breeds plentifully along the Gulf coast, whence reported from Texas. It is stated that the Oyster-catcher was always observed flying in pairs, and that not more than two were ever seen together.

288. Jacana gymnostoma (Wagl.). [568.] *Mexican Jaçana.*

A southern species, coming north to the valley of the Rio Grande, in Texas (Merrill).

289. Colinus virginianus (Linn.). [480.] *Bob-white; Quail.*

Resident over all of the Mississippi Valley, except in the extreme west and northwest. In Minnesota it has followed up the settlements, and in the eastern part of the State has reached the line of the Northern Pacific Railroad, about latitude 46°. At latitude 47° I neither saw it nor heard of it. In southeastern Dakota it is abundant and has advanced to about latitude 44° 30′. Northwestern Minnesota and most of Dakota are yet to be occupied by this species.

The question is often asked whether the habit Quail have of "lying to a dog" is natural or acquired. To get a satisfactory answer one has only to hunt in different parts of Indian Territory. In the region west of Fort Sill the Quail never think of stopping when they see a dog, but run as fast as possible, and upon his near approach they flush immediately, just as we may suppose they do on the approach of a coyote. In the eastern part of the Territory, near the railroad, the Quail lie quite well to a dog, and as they are exceedingly abundant, excellent sport may be had from November to March.

289b. Colinus virginianus texanus (Lawr.). [480*b.*] *Texas Bob-white; Texas Quail.*

This is the form which inhabits Texas, where all the stations reported it as resident and common. Its range extends northward to western Kansas.

Mr. Atwater writes from San Antonio, Tex.: "These Quails often come close to the ranch and lay eggs in hens' nests—I suppose on account of the protection thus afforded against snakes. I have hardly ever found nests of any kind of bird on the ground. Lark Finches always build in trees in this locality. These facts I explain on the snake theory." Mr. Lloyd found nests at San Angelo, Tex., May 12 and 14, 1882. These Quails raise two broods a year, nests having been found in 1883 as late as August 18. Clutches of 12, 13, 14, 15, 14, and 12 eggs have been taken.

293. Callipepla squamata (Vig.). [484.] *Scaled Partridge; Blue Quail.*

Like the last, the Blue Quail is resident in western Texas. It was reported as rare at Eagle Pass, and common at San Angelo and Mason. Mr. Henry says it is common for 75 miles north and west of Mason, Tex. Mr. Lloyd gives the following information concerning its range: "The habitat of this bird runs east [of San Angelo] about 30 miles. I shot both male and female last May near the mouth of the [Concho] river, and on inquiry found they were the first ever seen beyond the above limit. The northeastern boundary of their range I believe is Runnels and Taylor counties, near Abilene, on the Texas and Pacific Railroad."

In 1882 Mr. Lloyd took a nest with 13 eggs at San Angelo, Tex., April 26, and another, containing 6 eggs, May 13. In 1884 a nest with 12 eggs was taken May 7.

Two specimens were shot at Bonham, Tex., latitude 33° 34′, in December, 1885, from a covey of about a dozen. The species had never been seen before in that vicinity.

293a. Callipepla squamata castanogastris Brewst. [—]. *Chestnut-bellied Scaled Partridge.*

This beautiful Quail inhabits eastern Mexico and the Lower Rio Grande valley in Texas. The eastern limit of its range is defined by the foothills of the Rio Grande, about 100 miles from the coast, below which it is a rare straggler (Sennett).

295. Callipepla gambeli (Nuttall). [483.] *Gambel's Quail.*

An inhabitant of northwestern Mexico and contiguous portions of the United States; resident in western Texas.

296. Cyrtonyx montezumæ (Vig.). [485.] *Massena Partridge; Massena Quail.*

This species is found from western Texas westward and southwestward. Mr. Henry recorded it as a rare resident at Mason, and Mr. Lloyd says it is resident in Tom Green county, 20 miles west of San Angelo.

297. Dendragapus obscurus (Say). [471.] *Dusky Grouse.*

A Rocky mountain species, recorded from the Black Hills.

298. Dendragapus canadensis (Linn.). [472.] *Canada Grouse; Spruce Partridge.*

Principally resident in British America, but in winter occurs as far south as Racine, Wis. In Minnesota it is resident from Minneapolis northward, becoming quite common in the immense forests of the northeastern part of the State, and extending westward to the edge of the prairie at White Earth.

300. Bonasa umbellus (Linn.). [473.] *Ruffed Grouse.*

Resident over all the Mississippi Valley except the southwestern quarter. In Nebraska it has been seen in the southeastern portion only, and though formerly known as a resident in eastern Kansas, is not now known to occur in the State. It is still reported from Missouri, and is common in Iowa. It is very scarce in northwestern Arkansas and is said not to occur in Louisiana, as it certainly does not in Indian Territory and Texas.

300a. Bonasa umbellus togata (Linn.). [— .] *Canadian Ruffed Grouse.*

This sub-species is the form inhabiting the dense evergreen forests of northern Maine and the British Provinces. It occurs as far west as eastern Oregon and Washington Territory. Specimens collected by Mr. Ernest E. Thompson have been sent from Manitoba and Lake of the Woods to Mr. Ridgway, who pronounces them typical *togata.*

300b. Bonasa umbellus umbelloides (Dougl.). [473*a*.] *Gray Ruffed Grouse.*

This is a bird of the Rocky Mountain region and western British America. Mr. Ridgway has examined specimens of it collected near Carberry, in western Manitoba, by Mr. Ernest E. Thompson.

301. Lagopus lagopus (Linn.). [474.] *Willow Ptarmigan.*

The Willow Grouse has been exterminated or driven away from most of its range in the United States. Formerly it visited northern Illinois in winter, but is not known to do so now. A few are still found in Minnesota, where it is so rare that the Indians have no name for it. The Willow Grouse was noted during the winter of 1883–1884 at Portage la Prairie, Manitoba, by Mr. Nash, who states that it visits Lake Manitoba every winter.

305. Tympanuchus americanus (Reich.). [477.] *Prairie Hen; Pinnated Grouse.*

The Prairie Hen is common on the prairies of the Mississippi Valley from southeastern Texas and Louisiana northward as far as our boundary, which it reached in 1881. In 1883 it began to be common at Pembina. In 1884 it became common at Winnipeg, Manitoba, and appeared in large numbers at Portage la Prairie, on the Assiniboine River (latitude 50°).* It has been gradually spreading westward, and previous to the great extension of the railroad it kept just about abreast of the settlements. Dr. Coues, writing in 1874, said that it then inhabited the eastern half of Minnesota, but he had no reason to believe that it occurred at all in northwestern Minnesota or northern Dakota. In June, 1879, Roberts and Benner saw several at Herman, Minn., 40 miles from the Dakota line.† In 1880 I found it abundant in northwestern Minnesota up to latitude 47° and only 40 miles from the Dakota line. I also heard that it was then not uncommon across the Red river, at Grand Forks, Dak. Now it has occupied the whole length of eastern Dakota, covering a strip from 30 to 60 miles in width. At the same time it has spread from middle to western Kansas, and from eastern Texas to Colman county, a little west of the middle of the State. Mr. Nehrling says of it in southeastern Texas near Houston: "Common resident on all the flat, grassy prairies. Is becoming scarcer every year." (Bull. Nut. Ornith. Club, Vol. VII, 1882, p. 175.) In Indian Territory it is found as far west at least as the middle of the State.

The following letter from Mr. C. W. Nash, of Portage la Prairie, Manitoba (latitude 50°), gives an interesting account of the invasion of that locality by this species:

> The first information I received of the appearance of the Pinnated Grouse in this Province was from a farmer living about 8 miles north of this town (Portage la Prairie), who had shot one in the fall of 1882. I did not see the bird, but from the description he gave me of it I could not mistake it. I immediately made inquiries among the hunters of this locality, but no one else had seen it. In the fall of 1883 I again heard of the bird in one or two places, but saw none myself. In the fall of 1884 it

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* Ernest E. Thompson in The Auk, Vol. III, 1886, p. 153.

† Bull. Nutt. Ornith. Club, Vol. V, 1880, p. 18.

became plentiful, comparatively speaking, in this neighborhood and to the eastward, that is to say, between here and Winnipeg. I had the good fortune to secure two specimens in rather a lucky fashion. I was out with a friend, chicken shooting, October 6, 1884, at Burnside, a settlement 10 miles west of this town, when we saw a large flock of Grouse alight in a stubble field near us. When we reached the field three birds got up, of which I killed two with the first barrel, and the other with the second barrel. Of the two first killed, one was a Pinnated Grouse, and the other a Sharp-tailed Grouse; the one killed with the second barrel was a Pinnated Grouse. I got no others, but heard of them from nearly all of my acquaintances who hunt. Strange to say, all that were obtained, except one, appear to have been young birds, and this one was in full plumage, having on each side of the neck the long, pointed feathers peculiar to the species. So far as I can learn with any degree of certainty, these birds are not yet (March, 1885) found much west of the place where I killed mine, nor farther north than 10 or 12 miles from Portage la Prairie. They are evidently working in here from Minnesota and Dakota, and are following the grain. Up to this time the Sharp-tailed Grouse has been very abundant, but, as might be expected, it is getting scarcer in the vicinity of the towns. So far, both birds here associate together when they pack and find food in the stubbles.

We have here a case of northward migration of young birds in the fall, similar to that which has been noticed so often in the case of the Herons.

At Portage la Prairie none were seen in spring until 1885, when a few were noticed and its "booming" was heard for the first time.

The Prairie Chicken is commonly said to be a resident bird, and so it is in the larger part of its range; but in Iowa a regular though local migration takes place. This has been mentioned by former writers, and in the spring of 1884 a special study was made of the matter. Many observers unite in testifying to the facts in the case, and, what is still more important, there is not a dissenting voice. One of the observers does not exaggerate when he says: "Prairie Chickens migrate as regularly as the Canada Goose." Summing up all the information received, the facts of the case are as follows: In November and December large flocks of Prairie Chickens come from northern Iowa and southern Minnesota, to settle for the winter in northern Missouri and southern Iowa. This migration varies in bulk with the severity of the winter.

During an early cold snap immense flocks come from the northern prairies to southern Iowa, while in mild, open winters the migration is much less pronounced. During a cold, wet spring the northward movement in March and April is largely arrested on the arrival of the flocks in northern Iowa; but an early spring, with fair weather, finds them abundant in the southern tier of counties in Minnesota, and many flocks pass still farther north. The most remarkable feature of this movement is found in the *sex* of the migrants. It is the females that migrate, leaving the males to brave the winter's cold. Mr. Miller, of Heron Lake, Minn., fairly states the case when he says: "The females in this latitude migrate south in the fall and come back in the spring about one or two days after the first Ducks, and they keep coming in flocks of from ten to thirty for about three days, all flying north. The Grouse that stay all winter are males."

In the spring of 1884, at Iowa City, Iowa, the first flocks passed over March 10, and the bulk March 22; at Newton, Iowa, the bulk was noted March 23. The "booming" of the species was recorded from March 7, at Caddo, Ind. Ter., to March 24, at Barton, Dak. In the spring of 1885, the commencement of "booming" was noted at Richmond, Kans., March 1, and at Argusville, Dak., March 27. At Newton, Iowa, the northward movement was very pronounced March 11.

Early nesting was reported at Durand, Wis., March 28; while at Vermillion, Dak., in 1884, a nest with sixteen fresh eggs was found as late as June 9.

In the fall of 1885, at Des Moines, Iowa, Pinnated Grouse were moving south in large numbers October 17.

307. Tympanuchus pallidicinctus (Ridgw.). [477*a*.] *Lesser Prairie Hen.*

This Prairie Hen inhabits the eastern border of the Great Plains, from southwestern Kansas to western Texas. Colonel Goss records it as "resident in southern Kansas; rare." In Texas Mr. Lloyd states that it is a winter visitor. He says:

> Seen in October and November in Concho county, and also in winter on Middle Concho, in Tom Green county. Abundant near Colorado City, on the Texas and Pacific Railroad. I believe this record extends the range to the southwest. Westward it was abundant to the foot-hills of the Davis mountains. Said to have been driven from the Pan Handle counties by the numerous prairie fires. (The Auk, Vol. IV, 1887, p. 187.)

308. Pediocætes phasianellus (Linn.). [478.] *Northern Sharp-tailed Grouse.*

The typical form is a British-American bird, reaching the United States only along our northern boundary. It is resident in Manitoba, and was reported as common at Portage la Prairie. Specimens sent to Mr. Ridgway from western Manitoba by Mr. E. E. Thompson are intermediate between true *phasianellus* and *phasianellus campestris.*

308b. Pediocætes phasianellus campestris Ridgw. [—.] *Prairie or Common Sharp-tailed Grouse.*

The home of the Prairie Sharp-tailed Grouse is on the plains and prairies of the United States east of the Rocky mountains and south to New Mexico. Dr. Agersborg states that at Vermillion, Dak., it "is getting rarer every year." I am indebted to Mr. Carr, of Waupaca, Wis., for the boundaries of its range in that State. He writes:

> Sharp-tailed Grouse are quite abundant on Sisson's prairie, Portage county, in the fall of the year, but as soon as cold weather sets in they keep in the edge of the woods. They are associated with the Prairie Hen (*Tympanuchus americanus*). They range in the northwestern portion of the State, from about the center of Waushara county, but are found most abundant in Waushara, Waupaca, Portage, Shawano, and Marathon counties, though there are not many in the two latter.

Colonel Goss says they are still resident in middle and western Kansas, but are becoming rare; while Dr. Watson says that in the vicinity of Ellis, Kans., they disappeared in 1875 and since then the Prairie Hen (*T. americanus*) has taken their place. Even in Illinois a few are still found, according to Mr. Ridgway, on the prairies of the northern part of the State, but are very scarce. They were recorded as rare residents at Grinnell, Iowa. In Grant and Traverse counties, in western Minnesota, they are "the common Grouse of the region." (Roberts and Benner, Bull. Nutt. Ornith. Club, Vol. V, 1880, p. 17.)

309. Centrocercus urophasianus (Bonap.). [479.] *Sage Grouse; Sage Cock.*

In the Mississippi Valley district the Sage Cock is found only along the extreme western edge of Kansas, Nebraska, and Dakota. Colonel Goss gives it as resident in western Kansas, and cites Mr. Cavanaugh as having often killed it among the sage brush in the southwestern corner of the State. The Colonel does not state whether or not there is any other record of the occurrence of the species in the State. This record has been called in question by Dr. Watson, of Ellis, Kans., who says there is not, and never has been, any sage brush in the southwestern part of the State, and hence no Sage Cock. He suggests that the bird Mr. Cavanaugh saw was the Chaparral Cock (*Geococcyx californianus*). There is no reason to doubt the other records.

310. Meleagris gallopavo Linn. [470*a*.] *Wild Turkey.*

Occurs locally throughout the Mississippi Valley, south to eastern Texas, and west to the plains; resident wherever found. The range of this "the noblest of American game-birds" has been gradually contracted by its extermination in the settled parts of the country. In 1874 Dr. Coues gave its northern limit as not far from the southern boundary of Minnesota. Dr. Agersborg states that it is resident, though not common, in southeastern Dakota. In 1881 it was common in Knox county, Ind. (Ridgway). It is still reported from Nebraska, Kansas, and Illinois, growing more abundant to the southward until in Indian Territory it is no longer uncommon. That it is abundant around Red Rock, Indian Territory, I can testify from personal experience. Here it rivals the Prairie Hen in numbers, and lying well to a dog affords splendid sport. In the winter of 1883–'84 flocks were seen which were variously estimated as comprising from two hundred to five hundred individuals. In the southern part of the Territory I have seen the bottom of a lumber wagon piled up with the results of a single night's sport. If one wants Turkey hunting let him come to Indian Territory from December 1 to the middle of January.

310*a*. Meleagris gallopavo mexicana (Gould). [470.] *Mexican Turkey.*

This, the original ancestor of the domesticated Turkey, inhabits the table-lands of Mexico, western Texas, and Arizona. Specimens referred to this form were taken by Mr. Atwater at San Antonio, Tex., where the species is resident; its eggs also were secured. Mr. Lloyd says of it in western Texas:

> Resident. Once very abundant on every creek, but now rarely to be met with. I flushed a hen from her nest—a depression in a patch of low bushes—May 29, 1882, con-

taining eight eggs; but I have frequently heard of them further south with ten to fourteen eggs. Another brood was raised on a small rushy island in Brady creek, in the eastern part of Concho county, the young running about June 1, 1883. (The Auk, Vol. IV, 1887, p. 187.)

311. Ortalis vetula maccalli Baird. [469.] *Chachalaca.*

The Chachalaca is an inhabitant of northeastern Mexico and the valley of the Lower Rio Grande in Texas, where it is abundant.

313. Columba flavirostris Wagl. [457.] *Red-billed Pigeon.*

This large Pigeon inhabits Mexico and Central America, coming north in summer to the Lower Rio Grande valley in Texas, where it breeds plentifully.

315. Ectopistes migratorius (Linn.). [459.] *Passenger Pigeon.*

The Pigeon is irregular in all its movements, wandering both in winter and summer in search of sufficient food to satisfy the hunger of its immense hordes. Mr. Lloyd tells us that the Nueces cañon, in southwestern Texas, is the winter home of countless myriads of Pigeons, but for the most part it is not a common species in the West. It winters usually from latitude 37° and always from latitude 36° southward, though I am confident that not a bird wintered within 20 miles of Caddo, Ind. Ter., in the winter of 1883-'84, and most of the local gunners claim that it never occurs in that part of the Territory. I never saw it there either in fall, winter, or spring.

In the spring of 1884 its northward journey commenced about the middle of March, and by March 16, stations here and there had noticed it up to latitude 42°. It was found about the forty-fourth parallel March 23, and reached Elk River, Minn. (latitude 45° 25′), March 29. The storms of April evidently delayed its progress, as it was not reported from Barton, Dak., until May 4, and did not reach Oak Point, Manitoba, until May 20. The bulk was reported from Portage la Prairie, Manitoba, May 12, a few having been seen previously. On May 21 fresh eggs were found.

In the fall of 1884 the bulk of Passenger Pigeons departed from Williamstown, Iowa, September 15, and the last was seen there September 27. At Mount Carmel, Mo., the first migrant was seen September 9, and the last September 21.

In the spring of 1885 the northward movement began somewhat later than in 1884. The only records made previous to April 1 were: Hennepin, Ill., March 26, and Milwaukee, Wis., March 31. During the first half of April migration was rapid though irregular, and April 18 the first arrived at Ossowo, Manitoba. In the fall of 1885 the first appeared at Saint Louis, Mo., September 19; Mount Carmel, Mo., September 27; and at Shawneetown, Ill., October 3. The last at Elk River, Minn., was recorded September 26, and at Mount Carmel, September 30.

This Pigeon is a common summer resident in Manitoba (Seton).

316. Zenaidura macroura (Linn.). [460.] *Mourning Dove; Carolina Dove.*

A common breeder throughout the Mississippi Valley. From latitude 36° southward this Dove can be found regularly and abundantly throughout the year. Between latitude 36° and latitude 38° it is a regular winter resident, occurring in flocks, but is not abundant; north of latitude 38°, although many are found each winter, they are merely single birds, that have found exceptionally favorable quarters. In the winter of 1883–'84 it was reported from as far north as southern Wisconsin (at Delavan). In the West it is not common in winter north of latitude 33°. In the spring of 1884, during the latter part of February, slight movements occurred, and a few 'firsts' were noted, but probably these were birds that had wintered not far off and were merely changing their feeding grounds. No real movement took place until about a week after the Passenger Pigeons commenced flying. In its northward progress the Carolina Dove averages about one week behind the Pigeon. March 23 and 24 it appeared at Saint Louis and neighboring points. March 28 to 30 seem to have been days of much movement, the van advancing from latitude 42° on the 28th to latitude 43° 43′ on the 30th. By April 6 it had reached Elk River, Minn. (latitude 45° 45′), and on the 11th, farther west, was reported from Linwood, Nebr., and Vermillion, Dak. The Dove ceases to be common as we approach our northern boundary, which has been given as the northern limit of its range. Nevertheless, I always found a few in Minnesota at latitude 47°, arriving the first week in May, and on the last day of May, in 1884, it appeared at Portage la Prairie, Manitoba (latitude 50°), where the species is common (Nash). At Winnepeg, Manitoba, it is rare (Seton).

In the fall of 1884 the bulk left Des Moines, Iowa, August 25, and the last was seen there the next day. During the winter of 1884–'85 the Mourning Dove was noted from Glasgow, Mo.; Reeds, Mo.; Shawneetown, Ill.; and Peoria, Ill. At Aledo, Ill., they are said to have been present during all previous winters, but none were seen there in 1885 until April. Migration began at Manhattan, Kans., March 5, and Paris, Ill., March 23. The birds reached Saint Louis, Mo., and Emporia, Kans., March 31, with a very early arrival at Leeds Centre, Wis., on the same date. During the first five days of April they were reported from Fayette, Mo.; Ferry, Iowa; Mount Pleasant, Iowa; Ames, Iowa; Grinnell, Iowa; Peoria, Ill.; Aledo, Ill.; Rockford, Ill.; and Durand, Wis.; but no regular progression can be traced from the first to the fifth of these days. There was no further advance until April 17 to 20, when they were noted from Fernwood, Ill.; Delavan, Wis.; New Cassel, Wis.; Ripon, Wis.; River Falls, Wis.; and Lanesboro, Minn. They were seen at Huron, Dak., April 23; Hastings, Minn., April 24; Argusville, Dak., April 25; and Menoken, Dak., May 10.

In the fall of 1885 the last was seen at Elk River, Minn., October 7; at Grinnell, Iowa, November 4; at Iowa City, Iowa, October 11; and at

Des Moines, Iowa, October 24. They began to flock at Shawneetown, Ill., August 20.

318. Engyptila albifrons (Bonap.). [463.] *White-fronted Dove.*

This Mexican species comes north in summer as far as the Lower Rio Grande valley in Texas, where it is not an uncommon breeder (Sennett and Merrill).

319. Melopelia leucoptera (Linn.). [464.] *White-winged Dove.*

This tropical American Dove comes north regularly as far as southern Texas, where it breeds abundantly. It was reported as a summer resident at Eagle Pass.

320. Columbigallina passerina (Linn.). [465.] *Ground Dove.*

Like the last, this Dove was reported from Eagle Pass only; but it ranges during the summer through most of the Southern States south of latitude 32°, being most common near the coast; a straggler was once taken at Locke, Mich.

321. Scardafella inca (Less.). [466.] *Inca Dove.*

A Mexican species, coming north to southern Texas. At Laredo, Tex., it is abundant. (Dr. H. B. Butcher, Proc. Acad. Nat. Sci. Phila., Vol. XX, 1868, p. 150.)

325. Cathartes aura (Linn.). [454.] *Turkey Buzzard; Turkey Vulture.*

An abundant breeder throughout most of the Mississippi Valley. Ordinarily it winters from about latitude 39° southward, though it was reported by Dr. Agersborg as usually resident at Vermillion, Dak., latitude 42° 56′. A short distance south of latitude 39° it is an abundant resident. Dr. Watson saw it at Ellis, Kans., during the warm intervals in the winter of 1883–'84. At Caddo, Ind. Ter., it was a most abundant winter as well as summer resident, and yet so great was the mortality among the cattle, that all the Buzzards and Carrion Crows together could not rid the prairies of their carcasses. In the fall and early winter, when cattle feed was good and dead animals were few, these two species had hard work to get a living. They could be seen sailing overhead in great flocks watching for food, or sitting in long lines on the fences. An animal killed in the morning would be picked clean by night, and there was great quarreling and fighting over the carcass. After the snows and freezing rains came cattle began to die by the hundred, and before spring more than 15,000 died within 30 miles of Caddo. Then scarcely a Buzzard was ever seen in the air. They became so particular that they would not touch a carcass on the prairie, but selecting those that had fallen in or near timber, would gorge themselves, fly heavily to the nearest tree, and stay there until there was room in their bodies for more of their disgusting food. All Texas observers except Mr. Lloyd record the Turkey Buzzard as a winter resident. Mr. Lloyd states that it never winters in Tom Green or Concho counties (where it is an abundant summer resident), though he found it wintering in great numbers at the Nueces cañon, south of San Angelo. In the spring of 1884 the first reached San Angelo March 11, and the next day they were numerous. A single one had been seen at Saint Louis February 26, but the general movement commenced there three weeks later. On March 16 they appeared at Hillsborough, Ill. (latitude 39° 12′), and at Mount Carmel, Mo. (latitude 38° 45′). By March 27 they had advanced to latitude 40°. April 4 and 5 found them at latitude 41° and 42° in Iowa, and April 9 at latitude 41° 58′ in Illinois; April 12 they were seen at Williamstown, Iowa (latitude 42° 55′), and April 20, at Huron, Dak. (latitude 44° 21′). This is rather late migration, for I used to note them at latitude 47° in Minnesota the first week in April. They were not reported from Portage la Prairie, Manitoba, until May 23. They are common in summer in the Assiniboine valley (Seton). Their farthest extension north occurs in our district, where they have been traced to latitude 53° in Manitoba, while on the Atlantic coast they are rare above latitude 40°.

In the fall of 1884 the bulk of Turkey Buzzards left Williamstown, Iowa, September 25; and the last was seen at Mount Carmel, Mo., October 22. It is reported to have spent the winter of 1884–'85 at Shawneetown, Ill.

The records of the northward movement in the spring of 1885 are too irregular for systematic arrangement. The most northern records received are: Manhattan, Kans., April 4; Lanesboro, Minn., April 27; and Hennepin, Ill., April 6. In none of the records for 1883, 1884, or 1885 do the dates of arrival correspond with the times at which I noted the species at White Earth, Minn., during the three previous years. They came there with the first large wave of spring migration. In 1880 the first was seen April 1, just after the arrival of the Robin, Red-winged Blackbird, and Mallard, which came during the last days of March. The next year, 1881, spring migration was late, and no Turkey Buzzards were seen until April 8; the first Robin, April 14; the first Golden-shafted Flickers, Red-winged Blackbirds, and Mallards, April 17. The average temperature from April 1 to 6 was 3 degrees below zero. April 2 and 3, 1882, were very different, snow melting rapidly, roads so bare as to forbid the use of sleighs, and a general feeling of spring everywhere. During these two days the first arrivals were noted of Turkey Buzzards, Canada Geese, Red-tailed Hawks, Marsh Hawks, Sparrow Hawks, Red-winged Blackbirds, Killdeer, Meadowlarks, and Ring-billed Gulls, with the first Robin two days later. During the spring of 1885 I happened to revisit White Earth just as the first wave of migration arrived. April 4, 5, and 6 it brought the Sparrow Hawk, Red-tailed Hawk, Marsh Hawk, Killdeer, Robin, Red-winged Blackbird, Brewer's Blackbird, Meadowlark, and Brown Crane, but not a single Turkey Buzzard was seen. In the fall of 1885, at Iowa City, Iowa, the last Turkey Buzzard was seen October 3; at Grinnell, Iowa, November 4, and at Fayette, Mo., October 28.

326. **Catharista atrata** (Bartr.). [455.] *Black Vulture; Carrion Crow.*

This short-winged cousin of the Turkey Buzzard is his constant companion in the Southern States, but is left far behind in the vernal race for the frigid zone. The Carrion Crow is content to remain in or near his winter home and become common scavenger all the year round. He is scarcely migratory, his movements being wanderings rather than migrations. As in the case of the Turkey Buzzard, he shuns San Angelo during the winter, though he returned there March 19, 1884. Up the Mississippi Valley he is found resident as far north as southern Illinois, and has been taken once in Ohio. He has been seen twice in southern Kansas and once nested there. At Ellis, in western Kansas, Dr. Watson captured one March 27, 1885, the only record for that locality. From latitude 36° to 38° he has the mixed character of both resident and summer resident, remaining in some places the whole year and appearing at others in the summer only.

327. **Elanoides forficatus** (Linn.). [426.] *Swallow-tailed Kite.*

This beautiful and graceful species breeds sparingly throughout the Mississippi Valley from the Gulf of Mexico to Minnesota and Dakota, but is most abundant in the Southern States. It winters in Central and South America, but Mr. Bibbins recorded it as a rare winter visitant at Mermenton, La., and Major Young mentioned it as a winter bird at Waverly, Miss. A most extraordinary winter record is that given in the Bull. Nutt. Ornith. Club (Vol. III, 1878 p. 147), where the species is said to be found in winter and early spring on the James river, in southeastern Dakota. Again, November 14, 1881, Mr. D. H. Talbot saw several a short distance west of Jamestown, Dak., and three days later, about midway between Jamestown and Bismarck, he saw fifty or more in a flock (Bull. Nutt Ornith. Club, Vol. VII, 1882, p. 59). It is incomprehensible how a bird which so constantly shuns cold weather could stand the terrible winters of southern Dakota. It is safe to say that none were within the limits of Dakota in January, 1884.

In the spring of 1884 I observed it at Caddo, Ind. Ter., April 1, and then, changing my residence to Red Rock, in the northern part of the Territory, I again noted its arrival April 12. At Fayette, Mo., it was seen May 9, and at Iowa City, Iowa, May 13. It is in the Mississippi Valley that the species finds its most northern range. In Minnesota it has been traced to Red Lake (latitude 48° 30′), and in Dakota, to Pembina (latitude 49°). Recently it has been recorded from Manitoba (The Auk, Vol. III, 1886, p. 328).

In the spring of 1885 the Swallow-tailed Kite reached Elk River, Minn., May 4. In the fall of 1885 the first arrival was recorded from Grinnell, Iowa, September 16. It was last seen at Saint Louis, Mo., August 20. Dr. Agersborg states that a few spend the summer at Vermillion, Dak.

328. Elanus leucurus (Vieill.). [427.] *White-tailed Kite.*

A southern species, ranging from southern Illinois and Indian Territory to Chili and Buenos Ayres. In western Texas Mr. Lloyd records it as a rare fall visitor. In the valley of the Lower Rio Grande it is rather rare (Merrill and Sennett). In eastern Texas, near Houston, Mr. Nehrling says of it:

> This rare and beautiful bird I have seen several times sailing over cotton fields. Its flight is easy and graceful, but not rapid; sometimes it stops a few moments and then descends with great velocity to the ground to capture a lizard or a snake. It is not shy, and is easily recognized by its white tail.

329. Ictinia mississippiensis (Wils.). [428.] *Mississippi Kite.*

Winters from the Southern States southward, and in summer passes up the Mississippi Valley regularly to Kansas and southern Illinois, and rarely to Wisconsin. At San Angelo, Tex., it is common in fall, and a few remain through the summer. In the spring of 1884 it arrived at Gainesville, Tex., April 23, and at Saint Louis, Mo., May 10.

In the fall of 1884, during September and October, it was common in small flocks at San Angelo, Tex.

In the spring of 1885 it appeared at Gainesville, Tex., May 6. In the fall of 1885 it was last seen at Saint Louis, Mo., August 18. In eastern Texas, near Houston, it breeds, but is not common (Nehrling).

331. Circus hudsonius (Linn.). [430.] *Marsh Hawk.*

Occurs over the whole of Manitoba and the Mississippi Valley in summer, and from northern Illinois and northern Kansas southward in winter. In western Texas it is an abundant resident. The most northern record in the winter of 1883–'84 was from Vermillion, Dak., where a few were seen in January. At Newton, Iowa, Mr. Preston says they usually winter, but none were seen from the fall of 1883 until March, 1884. At Caddo, Ind. Ter., they were twice as numerous during the winter of 1883–'84 as all the other species of hawks together, and were in the proportion of about three brown-colored to one blue individual. In the spring of 1884 they came to Saint Louis, Mo., and Newton, Iowa, March 10 and 11. March 18 they were seen at Lanesboro, Minn.; March 24 at Elk River, Minn.; April 11 at Portage la Prairie, Manitoba; and April 27 at Oak Point, Manitoba.

During the winter of 1884–'85 the Marsh Hawk was plentiful at Paris, Ill.

The notes on the spring migration in 1885 were very irregular, and extended over an entire month, from March 9, when the first was noted in central Iowa, to April 9, when it arrived at latitude 50° in Manitoba. In the fall of 1885 the last at Ossowo, Manitoba, was seen November 12; at Grinnell, Iowa, October 11; and November 6 it became common at Bonham, Tex.

332. Accipiter velox (Wils.). [432.] *Sharp-shinned Hawk.*

Range much the same as that of Cooper's Hawk, but a little more northern. In the spring of 1884 very few notes were contributed on its movements, and they relate to its arrival at latitude 41° 30′ in Illinois and Iowa about the middle of March, and at Portage la Prairie, Manitoba, April 16.

In the spring of 1885 the Sharp-shinned Hawk was noted, without any regularity, from various stations from Mount Carmel, Mo., February 17 (next one seen April 7), to Minneapolis, Minn., April 9.

In the fall of 1885 the first was seen at Bonham, Tex., October 14, and the last at Mount Carmel, Mo., October 16. In western Texas it is "abundant in fall; less so in winter" (Lloyd).

333. Accipiter cooperi (Bonap.). [431.] *Cooper's Hawk.*

Breeds throughout the Mississippi Valley, wintering in the southern parts. In the winter of 1883–'84 there was no record north of latitude 38°. One was caught at Pierce City, Mo., in the latter part of February, whose feathers were so coated with ice that it could not fly. In the spring of 1884 it reached Saint Louis March 11; March 25 and 26 was seen at Danville, Ill., and Laporte City, Iowa; and was reported from Fridley, Minn., March 18.

In the spring of 1885 the first Cooper's Hawk was seen at Mount Carmel, Mo., April 5, and the last May 10. The first was noted at Grinnell, Iowa, March 31; Laporte City, Iowa, and Lake City, Minn., April 26. In the fall of 1885 the last was seen at Mount Carmel October 30. In western Texas it is found with the preceding, common in fall and not rare in winter.

334. Accipiter atricapillus (Wils.) [433.] *Goshawk.*

A tolerably common fall and winter visitant in Manitoba (Seton), and a rare winter visitant to the northern part of the Mississippi Valley, coming south to Kansas, Missouri, and Illinois. Given by Mr. Agersborg as a winter visitor at Vermillion, Dak., but rare.

In the spring of 1885 a Goshawk was seen at Lanesboro, Minn., April 4.

334a. Accipiter atricapillus striatulus Ridgw. [433*a.*] *Western Goshawk.*

Mr. Lloyd states that in western Texas, in December, 1885, he shot a male Western Goshawk and saw its mate several times.

335. Parabuteo unicinctus harrisi (Aud.). [434.] *Harris's Hawk.*

The normal range of Harris's Hawk is from southern Louisiana and southern Texas southward. In the valley of the Lower Rio Grande, in Texas, it is an abundant resident. At Eagle Pass, in southwestern Texas, it was reported as an abundant summer resident.

337. Buteo borealis (Gmel.). [436.] *Red-tailed Hawk.*

Breeds throughout Manitoba and the Mississippi Valley, and stays quite far north in winter. During the winter of 1884–'85 it was reported from Vermillion, Dak., and Chicago, Ill.

In the spring of 1884 it was reported from various parts of Iowa, about the middle of March; from Lanesboro, Minn., March 2 (two being seen during a furious storm, and it was repeatedly seen the next week). April 3 it appeared at Two Rivers, Manitoba (latitude 49° 28′); and April 12 it reached Oak Point, Manitoba.

In the spring of 1885 the Red-tailed Hawk was seen at Laporte City, Iowa, March 3, and at Lake City, Minn., March 26. Various irregular notes were given from intervening places.

In the fall of 1885 the first returning migrants reached Bonham, Tex., November 10, and were common there November 19.

337a. Buteo borealis kriderii Hoopes. [436*a*.] *Krider's Hawk.*

An inhabitant of the Great Plains, the eastern limit of its range covering the western part of the Mississippi Valley from Minnesota to Texas. Has been taken in Minnesota, Wisconsin, Iowa, northeastern Illinois, Kansas, and Texas. Roberts and Benner took a young Krider's Hawk from the nest in western Minnesota in June, 1879, and Mr. Ridgway tells me he has examined two females shot from the nest in Minnesota.

337b. Buteo borealis calurus (Cass.). [436*b*.] *Western Red-tail.*

The Western Red-tail reaches the western border of the Mississippi Valley district. Colonel Goss records it as not uncommon in Kansas in winter. It has been taken also in Illinois, near Chicago (Nelson). The only observer who has had the good fortune to secure it is Mr. Lloyd, who finds it an abundant resident in Concho county, Tex., where it breeds from April 22 to May 22.

338. Buteo harlani (Aud.). [438.] *Harlan's Hawk.*

Harlan's Hawk is an inhabitant of the Gulf States and the lower Mississippi Valley, and has been found as far north as Kansas, Illinois, and Iowa. It was reported by one of the observers in former years from Liter, Ill., and has also been found at Warsaw, Ill., and at Gainesville, Tex. Nothing is known of its movements and breeding habits. The species was described by Audubon from a specimen killed in Louisiana.

339. Buteo lineatus (Gmel.). [439.] *Red-shouldered Hawk.*

The movements of this species are similar to those of the Red-tailed Hawk, with which it is often found during migration, but it does not go so far north, seldom passing beyond our northern boundary. In eastern Kansas it is a common resident (Goss). Both it and the Red-tail intended to spend the winter of 1883–'84, as usual, in the vicinity of Saint Louis, but the severe cold of the first week in January proved too much for them, and they migrated, to return with the first warm wave the last of the month. It was reported as wintering at Chicago, and as a rare winter resident in southern Missouri. It migrated at the same time as the Red-tail, and at Elk River, Minn., where the latter was not seen, it arrived March 24.

In the spring of 1885 the only record received on the migration of the Red-shouldered Hawk was a note of its arrival at Mount Carmel, Mo., April 5. In the fall of 1885 it appeared at Bonham, Tex., November 23. Mr. Lloyd says it is a rare resident in western Texas.

340. **Buteo abbreviatus** Caban. [440.] *Zone-tailed Hawk.*

This southwestern Hawk is a fall visitant in Tom Green and Concho counties, Tex., where it was noted September 10, 1884 (Lloyd). In Comal county, Tex., it was found breeding in May, 1878, by Mr. W. H. Werner, who secured a male specimen and a set of eggs. Two pairs were observed (Brewster, Bull. Nutt. Ornith. Club, Vol. IV, 1879, p. 80).

341. **Buteo albicaudatus** Vieill. [441.] *White-tailed Hawk.*

A southwestern species, breeding along the Rio Grande in Texas (Sennett and Merrill), and occurring in western Texas in fall and winter (Lloyd).

342. **Buteo swainsoni** Bonap. [442.] *Swainson's Hawk.*

Swainson's Hawk is common in Manitoba and along the Red River of the North, and it occurs throughout most of the Mississippi Valley, and thence west to the Pacific. It remains in the West quite far north during cold weather, and is a common resident in western Kansas and western Texas. Even in eastern Texas, near Houston, it is "not uncommon during the breeding season" (Nehrling). In 1884 a few were seen in January at Vermillion, Dak. It was not seen in Iowa until migration commenced. About April 1 it appeared at Newton and Laporte City.

In the spring of 1885 Swainson's Hawk was recorded at Newton, Iowa, April 16, and March 23 at Laporte City, Iowa. A nest with three eggs was found May 13 at San Angelo, Tex.

In the fall of 1885 the first south-bound migrant was seen at Emporia, Kans., October 10.

343. **Buteo latissimus** (Wils.). [443.] *Broad-winged Hawk.*

This is the only distinctively *eastern* Hawk occurring in the Mississippi Valley. It is found only rarely so far west as Kansas, the most westerly record being that of Dr. Watson, at Ellis, Kans. It breeds principally in the northern part of its range, being quite common in Minnesota (though it has been known to nest even in southern Texas), and in winter it passes south to Florida, and even to Central and South America. In spring migration in 1884 it passed through central Iowa about the middle of April, but only a few notes on it were reported.

In the spring of 1885 the Broad-winged Hawk arrived at Mount Carmel, Mo., March 23, at Laporte City, Iowa, March 30, and at Grinnell, Iowa, April 17. In the fall of 1885 none were seen at Mount Carmel, Mo., after September 12.

346. Asturina plagiata Schlegel. [445.] *Mexican Goshawk.*

The Mexican Goshawk occurs regularly as far north as the southern border of the United States, and occasionally up the Mississippi Valley to southern Illinois.

347a. Archibuteo lagopus sancti-johannis (Gmel.). [447.] *American Rough-legged Hawk.*

The whole army of these Hawks crosses our northern boundary twice a year. During the winter they are distributed over most of the Mississippi Valley, the exceptions being the extreme northern and extreme southern portions. They are most numerous in the middle sections, thinning out each way. At Elk River, Minn., all had passed south by December 24, 1883. A little south of this point they remained all winter. At Vermillion, Dak., ten were seen during a day's tramp in January, 1884. At Mount Carmel, Mo., they were quite common all winter on the prairies, the bulk leaving March 10, and the last on the 24th.

In the fall of 1884 the first Rough-legged Hawk was seen at Mount Carmel, Mo., November 7. It used to be abundant there during the winter, but now is somewhat rare.

In the spring of 1885 the last was seen at Mount Carmel March 15. The first appeared at Oak Point, Manitoba, April 7, and they were common there April 10. In the fall of 1885 they returned to Mount Carmel November 10; the next was seen November 12, and by November 20 they were in usual winter numbers.

348. Archibuteo ferrugineus (Licht.). [448.] *Ferruginous Rough-leg; Ferruginous Buzzard.*

Chiefly a western species, a few coming east into the Mississippi Valley. It is resident in western Kansas, where Dr. Watson says it is tolerably common at Ellis every year. It has also been seen in western Nebraska, and is abundant in western Texas in winter. It has been seen once at Rock Island, Ill., and has been found nesting at Vermillion, Dak., and Grinnell, Iowa.

Mr. Balmer writes from Paris, Ill.: "On January 19, 1886, I had the good fortune to capture what I consider a rare bird for this State, viz, *Archibuteo ferrugineus*. He seems to have got a long way out of his latitude. He came with a thaw, in a south wind, after our big, big blizzard. I shot him out of a tree after dark, having marked him down for the night. The bird is a male, and measured 53 inches in extent."

349. Aquila chrysaëtos (Linn.). [449.] *Golden Eagle.*

In the western mountains this species comes far south in winter, even to New Mexico and Arizona, but nearer the Mississippi it comes only to Kansas. Some years ago one was taken in November at Fayette, in central Missouri, but it is very rare so far south. Several were seen and some captured in central and northern Iowa in the winter of 1883-'84, the last ones leaving from March 15 to 22. Most Golden

Eagles retire in spring to British America to breed, but Mr. Ridgway says that a few still breed in Northern Illinois, and they probably do so in northern Minnesota, as I have seen them there about the first of June.

In the spring of 1885 a Golden Eagle was reported from Paris, Ill., March 6; from Laporte City, Iowa, March 14; and from Williamstown, Iowa, March 30. Even as late as April 19 one was shot at Mount Carmel, Mo.

350. **Thrasaëtus harpyia** (Linn.). [450.] *Harpy Eagle.*

A tropical American species, rarely straggling as far north as our southern border. Said to have been taken once in Texas, at the delta of the Rio Grande (Oswald, Am. Nat., 1878, p. 151).

352. **Haliæëtus leucocephalus** (Linn.). [451.] *Bald Eagle.*

Locally distributed throughout the whole of North America. It has no regular migration, but after breeding throughout the Mississippi Valley it disappears from some places for the winter, while it remains at others. Generally speaking, it leaves the North when the freezing of the waters prevents it from getting its accustomed food, but sometimes it remains through the winter even as far north as latitude 47° in Minnesota, where, in the heavy pine forests, I have found it throughout the year, and where it nests quite commonly. In the spring of 1884 it moved back to summer quarters in northern Iowa about March 20.

In western Texas it is an abundant resident (Lloyd). In the fall of 1885, at Saint Louis, Mo., the first Bald Eagle was seen September 9. November 7 four were seen, and the next day two more.

354. **Falco rusticolus** Linn. [412a.] *Gray Gyrfalcon; Iceland Gyrfalcon.*

An accidental winter visitant from the north. A specimen was captured at Manhattan, Kans., December 1, 1880.

354a. **Falco rusticolus gyrfalco** (Linn.). [412b.] *Gyrfalcon: McFarlane's Gyrfalcon.*

Like the last, an accidental visitor in winter. Taken by Dr. Agersborg, at Vermillion, Dak., October 21, 1880.

354b. **Falco rusticolus obsoletus** (Gmel.). [412c.] *Black Gyrfalcon; Labrador Gyrfalcon.*

Has been taken in Minnesota a few times as a rare winter visitant; a specimen has been examined by Mr. Ridgway.

355. **Falco mexicanus** Schleg. [413.] *Prairie Falcon.*

This hawk is found principally in the West, but occurs east to the eastern border of the plains in Texas, Indian Territory, Missouri, Kansas, Nebraska, and Dakota. It winters from Kansas southward, and passes north in the summer to central Dakota, where it was noted as being very common in August. Dr. Agersborg gave it as a rare migrant in southeastern Dakota, but it is known to breed in Kansas, Missouri (Goss), and Texas. Mr. Nehrling states that it is resident, but not common, near Houston, in eastern Texas. It has been found in central Iowa, and even as far east as Illinois.

356. **Falco peregrinus anatum** (Bonap.). [414.] *Duck Hawk; Peregrine Falcon.*

This species occurs locally throughout the Mississippi Valley. It breeds more particularly in Manitoba and the northern half of the United States, but is known to breed also in Kansas, Mississippi, and Texas. In the fall of 1884 the last Duck Hawk was seen at Mount Carmel, Mo., November 12.

In the spring of 1885 it was seen April 4 at Lake City, Minn., and April 25 at Mount Carmel, Mo.

357. **Falco columbarius** Linn. [417.] *Pigeon Hawk.*

Occurs over the whole of the Mississipi Valley, but is nowhere abundant; winters in the Southern States and southward; breeds in British America. A few stragglers were found at San Angelo, Tex., in the winter of 1883–'84, the last of which left February 1, being the first bird to migrate. Near Houston, in eastern Texas, it is common in fall and winter (Nehrling). At Heron Lake, Minn., the first was noted March 27; and none were seen at Manhattan, Kans., until April 12. In the spring of 1885 the Pigeon Hawk was recorded from Ferry, Iowa, March 30; Clinton, Wis., March 31; Delavan, Wis., April 11; and Ossowo, Manitoba, April 18. In the fall of 1885 the first at Emporia, Kans., was noted October 10.

358. **Falco richardsonii** Ridgw. [418.] *Richardson's Merlin.*

Found principally on the Great Plains, and thence westward, but is most common just east of the Rocky mountains; south to Texas in winter; has occurred accidently in Michigan, and occasionally in Minnesota. Professor Aughey recorded it as rather common, and breeding, in Nebraska. Dr. Agersborg says it is a migrant in southeastern Dakota. Mr. Powell reports it from southeastern Nebraska. It probably breeds in western Kansas, where Colonel Goss says it is not uncommon. At Ellis, Kans., Dr. Watson noted the arrival of the first April 15, 1884. An accidental visitor has been recorded from Laporte City, Iowa.

359. **Falco fusco-cœrulescens** Vieill. [419.] *Aplomado Falcon.*

A tropical American species, breeding in the valley of the Lower Rio Grande in Texas (Merrill).

360. **Falco sparverius** Linn. [420.] *Sparrow Hawk.*

Inhabits the whole of Manitoba and the Mississippi Valley, and breeds throughout its range; but in Indian Territory and eastern Texas it is apparently rare and local as a breeder. In Tom Green and Concho counties, Tex., it is an abundant resident (Lloyd), but the summer birds pass south in winter and their places are taken by northern birds, so that the species is found all the time, though the same individuals are not present. Nests containing, respectively, five and six eggs were found near San Angelo March 15 and July 1, indicating two broods. This Hawk is said to have remained at Chicago the whole of the winter of 1883–'84. With this exception no winter record was received from any point north of latitude 37°.

In the spring of 1884 a single bird was seen at Saint Louis February 26, and a few days later (March 3) most of the winter residents were leaving Caddo, Ind. Ter. (latitude 34° 11′). In the case of this species, as in many others, no records of movement were made during the first two and one-half weeks of March. March 21 it appeared at Tampico, Ill. (latitude 41° 36′), and at Ellis, Kans. (latitude 38° 55′). By March 26 it had been seen along the Mississippi river as far north as Elk River, Minn. (latitude 45° 25′); and almost a month later (April 20) it appeared at Oak Point, Manitoba (latitude 50° 30′). In northern Illinois and Wisconsin arrivals were recorded until April 2.

In the fall of 1884 the last Sparrow Hawk at Mount Carmel, Mo., was seen September 27. It was reported as wintering at Shawneetown, Ill.

In the spring of 1885 the records of its northward movement were very irregular. They fell between the dates of March 14, at Tampico, Ill., and April 15, at Oak Point, Manitoba. The first was seen at White Earth, Minn., April 4. In the fall of 1885 the last at Grinnell, Ia., was recorded October 10, and at Mount Carmel, Mo., October 22.

362. **Polyborus cheriway** (Jacq.). [423.] *Audubon's Caracara; Caracara Eagle.*

Common along the Gulf coast, and abundant in southern Texas. At Eagle Pass and Mason, Tex., it was recorded as common and resident. At Eagle Pass it was building March 16, 1884.

Mr. Lloyd says of it:

> Resident in the eastern part of Concho county; a few visit the western half in fall; none seen in Tom Green county. Breeds. Nest found in live-oak, about 18 feet from the ground, with three eggs, April 24, 1881. The same nest was used for two years after. Though in the southern part of Texas they prey on carrion, in Menard and Concho counties they hunt prairie dogs in couples. (The Auk, Vol. IV, 1887, p. 189.)

Mr. Nehrling states that in eastern Texas, near Houston, it is regularly distributed, but not so common as in the interior. He says of it:

> It is a very showy bird, and the flight is extremely elegant and quick. Although it is very shy and not easily to be approached, it often builds its nest in trees not far from farm houses. The farmers say they are as harmless as Turkey Buzzards. The nest is usually from 25 to 30 feet above the ground, and is built of sticks, sometimes lined with bits of cotton and Spanish moss; the cavity is shallow. Often the birds, commonly single individuals, are to be observed with Vultures, feeding together on carrion. (Bull. Nutt. Orinth. Club, Vol. VII, 1882, p. 173.)

364. **Pandion haliaëtus carolinensis** (Gmel.). [425.] *Osprey; Fish-Hawk.*

Occupies the southern half of our district in winter, and the whole Mississippi Valley in summer. It migrates rather late. In 1884 it appeared at Newton, Iowa, April 12; at Laporte City, Iowa, April 15;

at Ellis, Kans., April 16; at Lanesboro and Red Wing, Minn., April 18 and 20, and at Alda, Nebr., April 25.

In the fall of 1885 the first southward migrant was seen at Emporia, Kans., September 30.

365. **Strix pratincola** Bonap. [394.] *Barn Owl.*

The Barn Owl is most abundant in the Southern States, where it is resident. It occurs north to Minnesota and Wisconsin (noted from La Crosse and Ripon), and west to Kansas and Nebraska. In western Texas it is rare (Lloyd); in eastern Texas common (Nehrling).

366. **Asio wilsonianus** (Less.). [395.] *Long-eared Owl.*

A common summer resident in western Manitoba; resident throughout the Mississippi Valley.

367. **Asio accipitrinus** (Pall.). [396.] *Short-eared Owl.*

A common summer resident in western Manitoba and Dakota. It occupies the whole of the Mississippi Valley; Resident in the northern half; occurs in the lower half chiefly in fall and winter.

368. **Syrnium nebulosum** (Forst.). [397.] *Barred Owl.*

The most common Owl of the Southern States, and found also over the whole of the Mississippi Valley and Manitoba; resident except in the extreme northern part of its range. At Caddo, Ind. Ter., the pellets thrown up at one time by a Barred Owl contained parts of a Brewer's Blackbird, a Cardinal Grosbeak, and a Le Conte's Sparrow.

368a. **Syrnium nebulosum alleni** Ridgw. (397*a*.) *Florida Barred Owl.*

Recently Mr. Ragsdale has taken this owl, previously known only from Florida, in Cook County, Tex. A specimen has been examined by Mr. Ridgway, and is now in the U. S. National Museum.

370. **Ulula cinerea** (Gmel.). [399.] *Great Gray Owl.*

A northern species; found occasionally in winter in Minnesota, Wisconsin, and Illinois.

371. **Nyctala tengmalmi richardsoni** (Bonap.). [400.] *Richardson's Owl.*

Another northern bird, occurring in winter in Minnesota, Wisconsin, and Iowa.

372. **Nyctala acadica** (Gmel.). [401.] *Saw-whet Owl.*

A common resident from northern Illinois northward; south of this a rare winter visitant.

373. **Megascops asio** (Linn.). [402.] *Screech Owl.*

An abundant resident throughout most of the Mississippi Valley, but said not to be very common in Minnesota. Mr. Carr killed one in the winter of 1883–'84 at Waupaca, Wis., which had nothing in its stomach but wheat, buckwheat, and miscellaneous seeds.

373a. Megascops asio floridanus (Ridgw.). [402*a.*] *Florida Screech Owl.*

This form of the Screech Owl, previously known only from South Carolina to Florida, was procured in southern Louisiana by Dr. A. K. Fisher, who examined several specimens.

373b. Megascops asio mccallii (Cass.). [402*b.*] *Texas Screech Owl.*

Resident in Texas, whence reported from Tom Green and Concho counties, where it is abundant in winter from about September 10 to March 10 (Lloyd). In eastern Texas, near Houston, it seems to be common (Nehrling).

375. Bubo virginianus (Gmel.). [405.] *Great Horned Owl.*

A common resident over the whole of the Mississippi Valley east of the Great Plains.

The following unique owl story was contributed by Mr. H. F. Peters, of Bonham, in northeastern Texas:

> On the 10th of March, 1883, I was out hunting in some woods, and flushed a Great Horned Owl from a large stump about 20 feet high. I shot at and missed it, but coming up to the stump I could see an Owl's head above the top of it. I would not shoot him there as I did not want to climb for him. It was hard work to make him leave the stump, but, by nearly hitting him with a stick, he flew off and I killed him. He was a young Great Horned Owl. When he left the nest I distinctly saw something move there. My son climbed up and found two owlets about six or eight days old. We left them there, and that evening at dusk I killed a female Barred Owl, and the next morning a male Barred Owl off the top of the same stump where the young ones were. We then secured the two young owls and kept them a year, until they grew to be two fine Barred Owls. A few days later I killed two Great Horned Owls (a male and female) in close proximity to the place. Thus we have a case of two species of owls breeding at the same time in the same nest, with at least a month's difference in the ages of the young. The young Horned Owl was barely fledged, and I am sure had never been out of the nest until I drove him out. There were bones and offal around the stump, showing that it had been used for some time as a breeding place.

375a. Bubo virginianus subarcticus (Hoy). [405*a* in part.] *Western Horned Owl.*

This is the western representative of the Great Horned Owl. It breeds from western Manitoba and Dakota southward, over the Great Plains, to Texas, and even to the table-lands of Mexico. Stragglers have been taken in Wisconsin and northern Illinois. Dr. Agersborg states that it occurs in southeastern Dakota nearly every winter. In Tom Green and Concho counties, in western Texas, where it is an "abundant resident," Mr. Lloyd says of it:

> Breeds from February 20 to end of May in hackberry or mesquit on prairies, and in holes in the large pecans on rivers. I have rarely found more than two eggs in one clutch; three, however, occur in about one nest in six. Feeds on poultry, skunks, and rabbits, and is often on wing during the day. The birds seem to grow lighter with age. (The Auk, Vol. IV, 1887, p. 190.)

375b. Bubo virginianus arcticus (Swains.). [405*b.*] *Arctic Horned Owl.*

Breeds in Arctic America, coming south in winter, irregularly and rarely to Dakota, Montana, and Wyoming.

376. Nyctea nyctea (Linn.). [406.] *Snowy Owl.*

A great wanderer in winter, visiting the United States, and appearing without any regularity in all of the northern tier of States, and southward into Kansas, Missouri, and Illinois, and has been taken even in Texas. It seems to have been less common than usual in the winter of 1883–'84, though Mr. Lindley, at Mitchell, Iowa, had the good fortune to see nine. At Linwood, Nebr., the last seen in 1884 was noted February 1, but at Heron Lake, Minn., one was seen as late as April 3. The winter of 1876–'77 was noted for the great numbers of Snowy Owls which migrated into the United States. They came November 22, 1876, and for two weeks afterwards were common as far south as Saint Louis. At Omaha and Denver they were specially abundant. One taxidermist in the East had thirty Snowy Owls sent him from this single flight.

In the spring of 1885 a Snowy Owl was seen at Clinton, Wis., February 23, and at Huron, Dak., March 7. In the fall of 1885 the first came to Elk River, Minn., October 23. At Chicago, Ill., one was seen in the city November 3. A magnificent specimen, almost pure white, was shot at Chrisman, Ill., the latter part of January, 1886.

377a. Surnia ulula caparoch (Müll.). [407.] *Hawk Owl.*

The Hawk Owl visits the upper Mississippi Valley in winter. It has been taken in winter in Minnesota and Wisconsin, and once in northern Illinois. Occasionally in severe winters it has been found in the East as far south as Pennsylvania. It is therefore the more strange that one should be found so far south as Mississippi. Dr. Rawlings Young, of Corinth, Miss., writes: "In January, 1882, I was shooting quail over a brace of setters in a thick sedge grass 300 or 400 yards from the timber, and while working up a scattered bevy the dogs pointed. Walking in, a Hawk Owl, much to my astonishment, got up from the grass right under the dogs' noses. As he went off I cut him down, and had no trouble in identifying him from the cuts seen in Wilson."

In the fall of 1884 a Hawk Owl was reported from Elk River, Minn., October 27. At Mount Carmel, Mo., the first was seen December 26. In January, 1885, about a dozen were reported as wintering at Elk River, Minn. In the spring of 1885, at Mount Carmel, Mo., the last was seen March 10. In the fall of 1885 the first returned to Elk River, Minn., October 23.

378. Speotyto cunicularia hypogæa (Bonap.). [408.] *Burrowing Owl.*

Wherever prairie dogs exist Burrowing Owls are also very likely to be found, so that their range may be said to include most of the open prairie ground west of the Mississippi river. They are especially abundant in western Nebraska, middle and western Kansas, and Indian Territory; and as I write from Red Rock, in that Territory, I can look out on a dog town several miles in extent, in which the Burrowing Owls are usually numerous. Even as far east as Waverly, Miss., Major Young writes that they were formerly quite common, but have not been seen for some time. Mr. Nehrling states that near Houston, in eastern Texas, they are "every year increasing in numbers." At San Angelo, Tex., they have been found breeding from April 1, to May 10.

The Burrowing Owl is resident from southeastern Dakota southward. By many it is erroneously supposed to hibernate, and it may be that some of the northernmost colonies change their dwelling places during the winter so as to disappear from certain localities at this season. Dr. Agersborg says that it is a permanent resident in southeastern Dakota, where from seven to nine eggs constitute a full clutch. He further states:

> In the winter as many as twenty of these birds may be found nestling together in one hole. They are always at such times abundantly supplied with food. I have found at one time forty-three mice and several Shore Larks scattered along the run to their common apartment. They forage in fine weather, and retreat to their dirty abodes when cold weather threatens.

It is possible that those individuals that spend the summer far north in Dakota actually and regularly migrate. In 1884 Mr. Edwards noted their return to Argusville, Dak. (latitude 47° 08′), April 30.

380. **Glaucidium phalænoides** (Daud.). [410.] *Ferruginous Pigmy Owl.*

A tropical American species, coming north to the valley of the Lower Rio Grande in Texas (Sennett).

382. **Conurus carolinensis** (Linn.). [392.] *Carolina Paroquet* or *Parakeet.*

This beautiful Parrot formerly was resident throughout the Mississippi Valley and the South Atlantic and Gulf States. It no longer exists in the northern part of its former range, and can scarcely be found north of latitude 36°. So far as known, it is now confined to isolated localities in the Gulf States and the lower Mississippi Valley. At Fayette, Mo., it was reported as present, though almost extinct. Formerly immense flocks were found all over Indian Territory. At present it is almost extinct in the eastern part of the Territory, though a few are still found around Caddo, and in the middle and western parts they are almost as numerous as ever.

Rhynchopsitta pachyrhyncha (Swains.). [391.] *Thick-billed Parrot.*

An abundant inhabitant of the pine forests of central and northern Mexico, coming north into southwestern Texas.

384. **Crotophaga sulcirostris** Swains. [390.] *Groove-billed Ani.*

A middle American species, coming north to Texas. It occurs in the valley of the Rio Grande (Sennett); and is a fall visitor in Concho and Tom Green counties, Tex., where one was shot in October, 1885, and several seen in October, 1886 (Lloyd).

385. **Geococcyx californianus** (Less.). [385.] *Road-runner; Chapparal Cock.*

A southwestern bird, noted by the Texas observers; resident wherever found. It was reported as abundant at Mason, Tex., and in Concho and Tom Green counties, breeding in the latter region from March 30 to May 8. Clutches of five, six, and seven eggs were taken. This species has been captured as an accidental visitor in Arkansas, near Fort Lyons; and was seen by Mr. Trippe in Colorado north at least to latitude 38°, which has led to the surmise that it was the species seen by Mr. Cavanaugh in southwestern Kansas, and reported by him to Colonel Goss as the Sage Cock. Colonel Goss, in a recent communication, states that in September, 1884, Mr. Charles Dyer saw two of these birds in western Kansas, along the line of the Atchison, Topeka and Santa Fé Railway, about 15 miles east of the western boundary of the State; and that he "has seen them quite often in Colorado, near the State line." Colonel Goss further states:

> The birds are known to breed as far east as Las Animas, and I feel confident that they occasionally breed in the southwestern corner of this State [Kansas], a natural habitat of the birds, but unsettled and little known, especially as to its bird life. (The Auk, Vol. III, 1886, p. 114).

386. Coccyzus minor (Gmel.). [386.] *Mangrove Cuckoo.*

This tropical Cuckoo has been found as far north as the coast of Louisiana.

387. Coccyzus americanus (Linn.). [387.] *Yellow-billed Cuckoo.*

The range of this species is considerably more southern than that of the next. It breeds from the Gulf of Mexico to the northern tier of States. Both species are said to winter in Florida, but the bulk passes still further south.

In the spring of 1884 the Yellow-billed Cuckoo entered our southern border the latter part of April, appearing at Rodney, Miss., and at Mason, Tex., April 28 and 29. At San Angelo, Tex., and Saint Louis, Mo., it was seen May 5 and 6, and at Burlington, Iowa, May 8. At Gainesville, Tex., and Ellis, Kans., it arrived May 12, and at Manhattan, Kans., and Iowa City, Iowa, May 20. It came to Laporte City, Iowa, May 27. In Tom Green and Concho counties, Tex., it breeds in June. At Laporte, Iowa, on June 11, 1884, a female was shot with eggs ready for the nest.

In the fall of 1884 the bulk was reported as leaving Williamstown, Iowa, August 15, and the last August 27. The last was reported from Des Moines, Iowa, October 1; from Mount Carmel, Mo., September 21; and from San Angelo, Tex., August 15.

For the spring of 1885 the records of the movements of this species in the West were quite full. It appeared at San Antonio, Tex., April 17; at Mason, Tex., April 22; Bonham, Tex., April 29 (though it had been noticed April 20 at Gainesville, Tex.). May 14 it reached Manhattan, Kans. In Missouri it was seen at Saint Louis May 15, and at Mount Carmel May 17. By May 20 it had reached Des Moines, Iowa, and Fernwood, Ill.

In the fall of 1885 the last was seen at Iowa City, Iowa, August 26, and at Fernwood, Ill., September 11. At Saint Louis, Mo., it was conspicuous September 22, was present in bulk September 25, and was last seen September 27.

388. Coccyzus erythrophthalmus (Wils.). [388.] *Black-billed Cuckoo.*

A common summer resident in Manitoba and most parts of the Mississippi Valley except the extreme southern portion. In the spring of 1884 no records were received relating to the date when it entered the United States, but it appeared at Saint Louis, Mo., and at Hennepin, Ill., May 5. May 12 it was seen at Coralville, Iowa; May 16 at Lake Mills and New Cassel, Wis.; May 22 at Elk River, Minn.; May 31 at Portage la Prairie, Manitoba, and June 1 at Oak Point, Manitoba (latitude 50° 30′).

In the fall of 1884 the bulk left Williamstown, Iowa, August 10, and none were seen there after that date.

In the spring of 1885 no notes were sent but those of 'firsts,' and they are as follows: Saint Louis, Mo., May 15; Des Moines and Grinnell, Iowa, May 16; Iowa City, Iowa, and Hennepin, Fernwood, and Rockford, Ill., May 17; Heron Lake and Elk River, Minn., May 22; and Shell River, Manitoba, June 16.

In the fall of 1885, at Elk River, Minn., it was last seen September 7. At Saint Louis, Mo., it became conspicuous September 22; the bulk was present September 25, and departed September 29; and the last was seen October 16. In Concho county, Tex., it is a spring and fall migrant.

389. Trogon ambiguus Gould. [384.] *Coppery-tailed Trogon.*

The home of this Trogon is in central and northern Mexico. Two specimens were killed in southern Texas in the summer of 1877 (Merrill, Proc. U. S. Nat. Mus., Vol. I, 1878, p. 118).

390. Ceryle alcyon (Linn.). [382.] *Belted Kingfisher.*

The Kingfisher is a common summer resident in Manitoba and the Mississippi Valley. Its winter home is bounded on the north by the southern limit of frozen water. His food is found in the water, and when cut off from it by the ice he must migrate or perish. The extreme cold of the winter of 1883–'84 sent him much further south than usual. While often seen in ordinary winters at latitude 39° in Kansas, none stayed in this latitude during the winter of 1883–'84, nor was there a record from any point north of latitude 36°, though it is probable that at favorable places, such as spring-holes, a few may have wintered. From the nature of the case the northward movement of the Kingfisher is irregular. Near rivers which open early he will be among the first birds to arrive, while at neighboring ponds and lakes many days may pass before he appears. But even the presence or absence of ice fails to explain a large share of the irregular notes. In Concho and Tom Green counties, Tex., it is an abundant resident (Lloyd).

In the spring of 1884 a single individual was seen at Saint Louis, Mo., February 25, but the regular movement did not begin until March

22 and 23, when the species suddenly spread from latitude 39° to latitude 41° 38′ in Iowa, and latitude 41° 36′ in Illinois, with an adventurous bird at latitude 42° 18′ in Iowa and another at latitude 43° 43′ in Minnesota, which latter was reported to have been seen at intervals all winter. By April 6 the van had reached latitude 44° 47′ in Minnesota, and latitude 44° 22′ in Wisconsin. April 14 they were recorded from Elk River, Minn. (latitude 45° 25′); April 20 from Frazee City, Minn. (latitude 46° 33′), and May 5 from Portage la Prairie, Manitoba. In the West, as usual, they were later. At Gainesville, Tex., the first was heard March 17, and at Manhattan, Kans., two days later. At Ellis, Kans., none were seen until April 3; and April 21 they came to Vermillion, Dak.

In the fall of 1884 the bulk of the Kingfishers left Williamstown, Iowa, August 28, and the last on the same day. At Des Moines, Iowa, the last was seen September 17, and at Mount Carmel, Mo., October 12. At Lanesboro, Minn., a Kingfisher was seen December 5.

In the spring of 1885 the first noted in migration was seen at Paris, Ill., March 5, the next at Shawneetown, Ill., March 12; the next at Glasgow, Mo., and the next March 26, at Laporte City, Iowa, and at Mount Carmel, Mo. During the rest of March arrivals were noted from Manhattan, Kans.; Emporia, Kans.; Hennepin, Ill.; Saint Louis, Mo.; and Grinnell, Iowa. During the first two days of April they appeared at Peoria, Ill.; Knoxville, Iowa; Iowa City, Iowa; Aledo, Ill.; Tampico, Ill., and Lanesboro, Minn. From April 4 to April 6 they were reported from Fernwood, Ill.; Milwaukee, Wis.; Durand, Wis.; Hastings, Minn.; and Elk River, Minn. They reached Luck, Wis., April 24, and Shell River, Manitoba, May 1.

In the fall of 1885, at Elk River, Minn., the last was seen September 16; at River Falls, Wis., October 9; at Des Moines, Iowa, October 24; while at Lanesboro, Minn., near a rapid stream, which is very late in freezing, they were still present November 30.

391. **Ceryle cabanisi** (Tschud.). [383.] *Texas Kingfisher.*

As its name implies, this bird inhabits Texas, though the center of its distribution is in tropical America. Mr. Lloyd says he has found it in Nueces and Frio Cañons, in Edwards county, but not further north. Mr. Henry recorded it as a rare summer resident in Mason county, a few miles northeast of Edwards county. In April, 1878, its eggs were taken in Comal county, Tex., by Mr. W. H. Werner (Bull. Nutt. Ornith. Club, Vol. IV, 1879, pp. 79, 80). It is probably resident throughout its range.

392. **Campephilus principalis** (Linn.). [359.] *Ivory-billed Woodpecker.*

This is the largest Woodpecker of the Mississippi Valley, to the southern part of which it is limited, as far as our district is concerned. It is a resident wherever found. Ridgway says it was formerly resident in southern Illinois, but is now extinct in most parts of that State. At

Fayette, Mo., Mr. Lientz marks it as formerly breeding, but not known to do so at present. It is still found in northeastern Arkansas, being abundant at Newport, and not very wild or wary, and thence westward to Caddo, Ind. Ter., where a few were seen during the winter of 1883–'84 in the heaviest timber of the bottom lands, together with the Pileated Woodpecker. A few have been seen at Kansas City, Mo., during the past few winters, and it probably still breeds in that vicinity. Mr. Nehrling states that it is rare and very shy in the northern part of Harris county, and in Montgomery county, Tex.

393. Dryobates villosus (Linn.). [360.] *Hairy Woodpecker.*

The whole of the Mississippi Valley, except the Gulf States, is inhabited by this species.

393a. Dryobates villosus leucomelas (Bodd.). [360*a.*] *Northern Hairy Woodpecker.*

The northern representative of the preceding. Inhabits British America, coming south in winter to the northern border of the United States. Recorded by Mr. Seton (now Thompson) as a common resident in western Manitoba.

393b. Dryobates villosus audubonii (Swains.). [360, part.] *Southern Hairy Woodpecker.*

An inhabitant of the South Atlantic and Gulf States.

393c. Dryobates villosus harrisii (Aud.). [360*b.*] *Harris's Woodpecker.*

This is the western form of the Hairy Woodpecker, occurring from the Rocky mountains to the Pacific. Dr. Agersborg says it is common and resident at Vermillion, Dak., thus bringing it within our district.

394. Dryobates pubescens (Linn.). [361.] *Downy Woodpecker.*

Like the Hairy Woodpecker, this species is resident in Manitoba and over the whole of the Mississippi Valley, but is a little more given to changing its feeding grounds. It has no regular migration, but, like all the non-migratory Woodpeckers, it roves around during the winter in search of food. This causes it to disappear at some places in the winter, and when it returns again it is supposed by the observers to have been regularly migrating, whereas it may have been north, east, south, or west; it may have been in the next county, or it may have wandered a hundred miles or more away. It is rare in central Texas, where one was shot in January, 1883, on the Middle Concho river (Lloyd).

394a. Dryobates pubescens gairdnerii (Aud.). [361*a.*] *Gairdner's Woodpecker.*

A western Woodpecker; rare along the northern half of the western border of our district. Mr. Allen found it along the Missouri in central Dakota, and thence westward, but not common.

395. Dryobates borealis (Vieill.). [362.] *Red-cockaded Woodpecker.*

A bird of the southern swamps. The most northern record received from the observers came from Newport, Ark., where it has been found several times in the pine timber. Near Houston, in eastern Texas, it is not rare (Nehrling). It is resident throughout its range.

396. Dryobates scalaris bairdi (Sclater). [363.] *Texas Woodpecker.*

Resident in Texas; noted from San Angelo as very abundant, breeding from April 10 to May 15, where clutches of four, five, six, and eight eggs were taken. Common also in eastern Texas (Nehrling) and in the valley of the lower Rio Grande (Sennett & Merrill).

400. Picoides arcticus (Swains.). [367.] *Arctic Three-toed Woodpecker.*

Resident in Manitoba and northern Minnesota. This is one of the migratory Woodpeckers, but its movements are not extensive. In the Mississippi Valley these movements are limited to a migration from its summer home in British America to the United States, where it remains during the winter, returning in the spring. Even in winter it is more abundant in Manitoba than in summer. Individuals have been known to occur in northern Illinois, but are seldom seen south of latitude 40°. They were reported by Vernon Bailey from Elk River, Minn., and some years ago I met them at White Earth, Minn., and had the pleasure of ascertaining that they nested in that State.*

402. Sphyrapicus varius (Linn.). [369.] *Yellow-bellied Woodpecker.*

A common summer resident in Manitoba and the northern part of the Mississippi Valley. This is one of the three regularly migratory Woodpeckers which inhabit the Mississippi Valley, and its migrations are more extended than are those of either of the others. The extreme limits of its range are separated by 3,000 miles, for it has been recorded from Guatemala to Greenland, but of course no single individual has traversed the whole of this distance. Still, since it seldom breeds south of latitude 42°, the most unambitious has many a long mile to travel. In the winter of 1883-'84 it was found as far north as Danville, in Illinois, and Morning Sun, in Iowa, but was rare at both places. From these points southward for 300 miles it is a rare winter visitant, but its regular winter home is south of latitude 37°. Even at Caddo, Ind. Ter. (lat. 34° 11′), it was not common, and its quietness and retired habits made it seem even less numerous. In the spring of 1884, migration commenced at Gainesville, Tex. (lat. 33° 36′), March 6, when the bulk of the winter residents departed; the last followed on the 11th. Migrants had become quite numerous at Pierce City, Mo. (lat. 36° 56′), by March 19, and this wave brought the first of the migrants to Saint Louis March 26. An accidental bird was seen at Chicago February 16, but the regular advance did not reach there until about the 8th of April. By April 10 they had reached Lanesboro, Minn. (lat. 43° 43′). They were seen at River Falls, Wis. (lat. 44° 45′), April 12, and two days later at Elk River, Minn. (lat. 45° 25′). The bulk rarely falls more than three or four days behind the van, and the last one does not lag far in the rear. Though rarely breeding south of latitude 42°, it nests regularly but a short distance farther north. It has been known to breed at La Porte, Iowa (lat. 42° 18′), and Mr. Munroe states that between July 4 and 10, 1884, he shot several in the hills 50 miles west of Newport, Ark., where he saw others in June and August, though neither nests nor young birds were found. At Danville, Ill., they remained all summer, and two trees were found which contained their nests. No attempt was made to secure their eggs.

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*[In July, 1877, Dr. Thomas S. Roberts found this Woodpecker breeding in Carlton county, Minn. (Bull. Nutt. Ornith. Club, vol. IV, 1879, p. 154).—C. H. M.]

In the fall of 1884, at Des Moines, Iowa, the Yellow-bellied Woodpecker was last seen September 24. At Shawneetown, Ill. (lat. 37° 43′) a few individuals remained during the winter of 1884–'85.

In the spring of 1885 the notes of its northward movement were quite regular. It appeared at Saint Louis and Mount Carmel, Mo., March 31; Chicago, Ill., April 1; Des Moines, Iowa, April 13; Newton, Iowa, April 17; Green Bay, Wis. (two observers), April 19; Lanesboro, Minn., April 21; River Falls, Wis., April 21; Elk River, Minn., April 26; and Shell River, Manitoba, May 3. In the fall of 1885 the last at both Fernwood, Ill., and Des Moines, Iowa, were seen October 3. At Saint Louis, Mo., the first arrived September 16; there was an increase September 24, and the bulk arrived October 9. The first at Gainesville, Tex., was seen October 9.

402a. Sphyrapicus varius nuchalis Baird. [369*a*]. *Red-naped Sapsucker.*

Inhabits the Rocky Mountain region of the United States, south into Mexico. It was taken by Colonel Goss at Wallace, Kans., October 12, 1883, this being the first record for that State and probably for our district. It has since been taken by Mr. Lloyd, at Fort Davis, Tex., where it is a rare winter resident.

404. Sphyrapicus thyroideus (Cass.). [370.] *Williamson's Sapsucker; Black-breasted Woodpecker.*

The only Mississippi Valley record of this species was received from Mr. William Lloyd, who noted it as an irregular winter visitant in Concho and Tom Green Counties, Tex., where it was tolerably common in the winter of 1883–'84. Mr. Lloyd found it on the North Concho, and also in Nueces Cañon, in Uvalde County.

405. Ceophlœus pileatus (Linn.). [371.] *Pileated Woodpecker.*

Resident in Manitoba and over all the Mississippi Valley wherever there is heavy timber. Reported by many observers.

406. Melanerpes erythrocephalus (Linn.). [375.] *Red-headed Woodpecker.*

A tolerably common summer resident in Manitoba and throughout the Mississippi Valley. Mr. Allen found it abundant in west-central Dakota in the summer of 1873. Its winter range west of the Mississippi is much restricted. At Saint Louis it is a rare winter resident; a short distance south, in Illinois, Mr. Ridgway says that it is excessively abundant in the bottom-lands during the winter. Passing westward to Pierce City, Mo., it was recorded as a rare winter resident in the bottom-lands. Still farther southwest, at Caddo, Ind. Ter., it is so rare a bird in winter that none of the local hunters thought one could be found. A few were seen, however, one at a time, all through December and January. Near Houston, in eastern Texas, it is an abundant resident (Nehrling). Throughout the greater part of its range it is a more or less regular migrant, its movements depending largely, if not wholly, on the food supply. Though capable of withstanding great cold when food is plenty (as for instance when it spends the winter in northeastern New York),* it seems to much prefer a warm climate, and when in the south waits until the weather is settled before attempting the northward journey. In the spring of 1884, in the belt between latitude 39° and latitude 39° 30′ in Illinois and eastern Missouri, their winter numbers began to be increased about the middle of March, and in Illinois the first had advanced to Chicago by the end of the month. No such advance took place in Iowa. Not a Red-head was reported in the State before April 26, nor any further advance in Illinois until after May 1. By the 1st of May the advance in Iowa was at latitude 41° 38′, and by May 6 those on the western side of the Mississippi had overtaken those on the eastern side, and they were both together in Wisconsin and Minnesota at latitude 43° 43′. Four days later they had passed to West Depere, Wis. (latitude 44° 26′); May 15 they were reported from Minneapolis and Green Bay; May 19 from Elk River, Minn. (latitude 45° 25′), and the last day of the month they had penetrated to Oak Point, Manitoba (latitude 50° 30′). Near the Mississippi River the bulk may be looked for about ten or fourteen days after the arrival of the first.

In the fall of 1884 the bulk left Williamstown, Iowa, August 27, and Des Moines, Iowa, September 18. At Des Moines the last was reported September 19; and at Mount Carmel, Mo., November 11. At Shawneetown, Ill., it remained through the winter of 1884–'85, and a single pair wintered at Saint Louis, Mo. Several early records from points farther north indicate that the individuals seen had wintered not far from the localities whence they were reported. These records are: Fayette, Mo., March 10; Sioux City, Iowa, March 11; Durand, Wis., March 15; Keokuk, Iowa, March 22; and Lake City, Minn., April 13.

In regular migration in the spring of 1885 it was first noted from Saint Louis, Mo., April 16; an increase was observed April 21; it continued arriving slowly from April 22 to 26, and the bulk came from April 28 to May 1. As the rest of the notes for 1885 can not be arranged systematically they will be given in full. The "firsts" recorded were as follows: Ferry, Iowa, April 24; Williamstown, Iowa, and Lake Mills, Wis., April 25; Delavan, Wis., April 29; Fayette, Mo., and Grinnell, Iowa, April 30; Paris, Ill., Manhattan, Kans., and Milwaukee, Wis.,

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* Merriam, Bull. Nutt. Ornith. Club, Vol. III, 1878, pp. 124–125.

May 1; Fernwood, Ill., and Des Moines, Iowa, May 2; Rockford, Ill., May 3; Luck, Wis., May 4; Aledo, Ill., and Ripon, Wis., May 5; Batavia, Ill., and Rochester, Minn., May 10; New Cassel, Wis., May 13; Leeds Centre, Wis., and Waukon, Iowa, May 14; Ames, Iowa, and Elk River, Minn, May 15; River Falls, Wis., May 18. It was given as a very rare visitant near San Angelo, Tex., where one was shot in August, 1885. In the fall of 1885 the last at Elk River, Minn., was seen September 4; at River Falls, Wis., September 21; at Grinnell, Iowa, August 15; at Des Moines, Iowa, September 15; at Fernwood, Ill., September 26; and at Iowa City, Iowa, October 30. Many migrants were seen at Saint Louis, Mo., October 10, all going southeast.

408. Melanerpes torquatus (Wils.). [376.] *Lewis's Woodpecker.*

A western Woodpecker, rare in our district. It has been taken by Dr. Watson at Ellis, Kans., and is known to breed in the Black Hills of Dakota (Grinnell). In the fall of 1884 Mr. Lloyd added this species to the list of Texas birds. He says: "Two were here (near San Angelo) before Christmas, and four arrived after our bad Christmas norther." More recently Mr. Lloyd records it as a "winter visitor," tolerably common on Spring Creek.

409. Melanerpes carolinus (Linn.). [372.] *Red-bellied Woodpecker.*

South of latitude 35° in the Mississippi Valley the Red-bellied Woodpecker is an abundant resident; north of this latitude for about five degrees it is less common, but still resident; and from latitude 40° northward to the limit of its range it is more or less migratory. In Kansas it is an abundant resident (Goss). Mr. Peck writes from La Porte, Iowa (latitude 42° 18′), that a few breed, but that most of them migrate northward. Where they go is a mystery. None of the stations in northern Iowa reported the bird, and it is unknown in Minnesota. Years ago Mr. Trippe made the same observation, namely, that "during the winter it is exceedingly abundant in southern Iowa, from which section great numbers migrate on the approach of spring." In Nebraska, Prof. Aughey says they are rarely seen north of the Platte, and Dr. Agersborg states that it is a rare summer visitor in southeastern Dakota. In northern Illinois, Mr. Kline marks it as a rare resident, and I have found it a rare summer bird at Ripon, Wis., but am not aware of its occurrence there in winter. As Ripon is north of the southern boundary of Minnesota, it is probable the species will yet be found in that State. Dr. Hoy reported it from Racine, Wis., March 26, 1884. In central Texas, on the main Concho River, it is tolerably common in winter (Lloyd).

410. Melanerpes aurifrons (Wagl.). [373.] *Golden-fronted Woodpecker.*

Occurs in our district in Texas only. In the valley of the Lower Rio Grande it is an abundant resident. It was reported from Tom Green and Concho Counties, by Mr. Lloyd, who states that it is an abundant resident. He says it occurs west to the Castle Mountains, near Pecos

River, and north to the Texas and Pacific Railway. Mr. Brown found it at Boerne.

412. Colaptes auratus (Linn.). [378.] *Flicker; Yellow-shafted Flicker.*

A common summer resident in Manitoba and most of the Mississippi Valley east of the Plains; being replaced, in the west, by the following species. Along the eastern edge of the Plains all sorts of intermediate phases occur.

Few birds are better known or possess more local names than the present species. Yellow-hammer and Flicker are the names by which it has been most frequently reported, and the two in about equal proportion. Its winter home in 1883–'84 was somewhat farther south than usual. At Manhattan, Kans., large flocks remained all winter, but they were not reported from the rest of the State. In Missouri none wintered at St. Louis, nor were they mentioned from any station in the State before March. In Illinois they were found in the extreme southern part only. The species was a full degree, and in most places two degrees, south of its ordinary limit. Although mixing with *C. cafer* and the variety formerly known as *Colaptes auratus hybridus* in the western part on the Plains, yet true *auratus* is found throughout the Mississippi Valley, even to southwestern Texas, where it was noted from San Angelo in the winter of 1883–'84. Its spring migration begins early, being but little behind that of the Robin, and the bulk of these two species usually moves together. In 1884 a few individuals were influenced by the warm weather of the last of January and moved slightly, but no real movement took place until the second week in March. On March 10 and 11 they appeared at Saint Louis and Glasgow, Mo. (latitude 39° 14′). The Flicker, like the Red-headed Woodpecker, migrates faster on the east than on the west side of the Mississippi River. The record of its arrival on the east side is as follows: In Illinois it reached latitude 39° 43′ March 19; March 20 and 21 it reached latitude 41° 36′ and 41° 51′; March 24, latitude 41° 58′; March 26, latitude 43° in Wisconsin, and March 29, latitude 44° 26′. West of the Mississippi it had moved to latitude 41° 40′ in Iowa by March 26; to latitude 44° 26′ in Minnesota by March 28, and March 31 it was seen at latitude 45° and 45° 25′ in Minnesota, having thus overtaken those in Wisconsin. Farther west the dates were still later. The first was seen at Ellis, Kans., March 21; at Linwood, Nebr. (latitude 41° 22′), April 2; at Argusville, Dak. (latitude 47° 08′), April 16; and at Larimore (latitude 47° 52′) April 21. At Portage La Prairie, Manitoba, the first was seen also April 21, which makes the record irregular as compared with that from Dakota, but regular when compared with the notes from the region around the headwaters of the Mississippi. The bulk ordinarily appears from three to six days behind the first.

The variety formerly known as the Hybrid Flicker (*Colaptes auratus hybridus*) [378 *a*], consisting of those specimens which are intermediate between *auratus* and *cafer*, has been found along the western edge of our district, running into *cafer* in the west and *auratus* in the east. It was noted in the winter of 1883–'84 from Caddo, Ind. Ter., and a second time from Texas, this record being from San Angelo. At Caddo it was first seen January 11, and was more or less common during the rest of the winter, though outnumbered by both *auratus* and *cafer*. There is little to indicate that in its migration it differs from typical *auratus*.

In the fall of 1884 the bulk had departed from Elk River, Minn., before September 27. At Mount Carmel, Mo., a half dozen were seen December 10. During the winter of 1884–'85 the range of the Flicker extended somewhat farther north than in the winter of 1883–'84. More than the usual number wintered at Saint Louis, where none were seen the previous winter. It was seen also during the winter at Glasgow, Mo., Keokuk, Iowa, Fayette, Mo., and Griggsville, Ill. At La Porte City, Iowa, it was more common during the winter of 1884–'85 than ever before; while at Aledo, Ill., this was the only winter for many years when none were seen.

In the spring of 1885 the northward movement of the Yellow-shafted Flicker was later than in 1884. No positive records of migration were made until March 29 and 30, when the bulk reached Saint Louis, and the first were noted at Aledo, Ill., Ferry, Iowa, and Linwood, Nebr. Its progress for a few days seems to have been more rapid along the Mississippi River than farther east or west. By April 5 it had been noted from Mount Pleasant, Iowa; Grinnell, Iowa; Ames, Iowa; Clinton, Wis.; Lake Mills, Wis.; Lanesboro, Minn., and Rochester, Minn. April 7 it was reported from Chicago, Ill.; Delavan, Wis., and Lake City, Minn. Then, April 18 to 20 the line of the van reached the same parallel in Wisconsin and Minnesota, the first being seen at Milwaukee, Wis.; New Cassel, Wis.; Green Bay, Wis. (two observers); Durand, Wis.; River Falls, Wis.; Minneapolis, Minn. (two observers), and Heron Lake, Minn. It was seen at Oak Point, Manitoba, April 21.

In the fall of 1885 the last was seen at Elk River, Minn., October 13; at River Falls, Wis., September 29; at Fernwood, Ill., October 31. The first migrant reached Fernwood September 12, and they were conspicuous at Saint Louis, Mo., September 22. At the latter place many were seen going south October 5, and two days later migration reached its height, although the last migrant was not seen until November 11. At Bonham, Tex., it was first seen October 4; was next seen three days later, and became common by the 15th.

413. Colaptes cafer (Gmel.). [378 *b.*] *Red-shafted Flicker.*

This is a species which occupies the United States from the Plains westward. It is found almost to the eastern boundary of Texas, Indian Territory, Kansas, and Nebraska, but in Dakota its eastern limit curves sharply westward, nearly the whole of that Territory being occupied by *Colaptes auratus*. There seems to be but little difference between the movements of this species and those of *C. auratus*, though it is probable that a greater percentage of *C. cafer* go farther north to breed. At Manhattan, Kans., it was recorded as merely a winter bird, arriving December 8, and it was seen occasionally through the winter. In the spring of 1884, at Manhattan, the bulk arrived from the south March 15, and April 1 the last was seen. At Caddo, Ind. Ter., it was not seen until January 11, but after that date was common during the rest of the winter. It was rare near town, staying in or near the bottom-land. I do not think it ever remained to breed. At San Angelo, Tex., it was also marked as merely a winter resident, not breeding. Considering the two species and the variety once known as *hybridus* as they occur together at Caddo, Ind. Ter., we find that *auratus* arrives early in the fall and is a common winter resident; few, if any, breed there. After *auratus* has practically completed its fall migration and settled down to winter numbers, *C. cafer* and *C. auratus hybridus* came in together, and during the coldest weather all three are found in about equal numbers in heavy timber land, though *C. cafer* perhaps is the most abundant. It has been said that it is impossible to distinguish one species from the other without shooting them, but *auratus* and *cafer* can be easily distinguished by the difference in their call notes.

416. Antrostomus carolinensis (Gmel.). [353.] *Chuck-will's-widow.*

This is the southern Whippoorwill, and though it occurs as far north as southern Illinois (in some counties of which it is quite common), it is more abundant in the Gulf States, from which came all the notes contributed by our observers. In the spring of 1884 it was seen at Rodney, Miss., April 14, and the next day at Yazoo City. April 13, it came to Gainesville, Tex. It was found breeding at Newport, Ark.

In the spring of 1885 the only records received on the migration of the Chuck-will's Widow were notes of its appearance at Gainesville Tex., April 10, and at San Antonio, Tex., April 28.

417. Antrostomus vociferus (Wils.). [354.] *Whippoorwill.*

A common summer resident in Manitoba and the Mississippi Valley east of the Plains. In the spring of 1884 it appeared in eastern Concho County, Tex., where it was a summer resident, March 6. As it was not seen at Rodney and Yazoo City, Miss., until the last two days of March, it constitutes an exception to the general rule that species arrive earliest near the Mississippi River. The notes on this species, though quite numerous, are peculiar in that they do not contain a single record of the arrival of bulk, departure of bulk, or last. East of the Mississippi the rest of the record, omitting irregular occurrences, is as follows: April 15 they reached latitude 33° 34′ in Mississippi and latitude 36° 31′ in Tennessee; April 27 they were recorded at latitude 40° 08′ in Illinois; April 29 at latitude 41° 10′ in Illinois, and the next day at Chicago, latitude 41° 51′. They reached latitude 41° 58′ in Illinois May 1; Milwaukee, Wis., latitude 43°, May 3, and Green Bay, Wis., latitude 44° 30′, May 14. West of the Mississippi the record began at Reeds, Mo., latitude 37° 08′, April 8, and was carried on by arrivals at latitude 38° 45′ in Missouri, and latitude 39° 12′ in Kansas, April 17; at latitude 41° 14′ in Iowa, April 23; latitude 41° 38′ in Iowa, April 25; latitude 44° 47′ in Minnesota, May 2; and May 3, at latitude 45° 05′ and 45° 25′ in Minnesota. May 10, it was reported at Frazee City, Minn., (latitude 46° 33′), by Miss Gertrude M. Lewis; and another early date came from Oak Point, Manitoba (latitude 50° 30′), where it was seen May 8, by Mr. A. T. Small. The records on this species cover a stretch of country about 1,400 miles in length, and the average rate of migration (whether taken from the records east or from those west of the Mississippi River) is twenty miles a day. The rarity of the Whippoorwill over the region of the Great Plains is seen from the fact that not a single record was received from Nebraska or Dakota.

In the fall of 1884 the last Whippoorwill was seen at Elk River, Minn., September 23; at Lanesboro, Minn., September 22; and at Grinnell, Iowa, October 10.

The notes on this species for the spring of 1885 can be arranged with ease, since nearly all of them belong to one wave. The first records were: Mason, Tex., March 27; Gainesville, Tex., April 6; Reeds, Mo., April 12. The wonderful warm wave which occurred in the Mississippi Valley from April 19 to 24 induced the Whippoorwill to migrate over an immense stretch of country. During these days it was noted from Mount Carmel, Mo.; Peoria, Aledo, and Chicago, Ill.; Morning Sun, Ferry, Coralville, Iowa City, Newton, Grinnell, Ames, La Porte City, Williamstown, and Waukon, Iowa; Leeds Centre, Durand, River Falls, New Richmond, and Luck, Wis.; and Elk River, Minn. After such an extraordinary wave as the above it is natural that further advance would be long delayed, and no report came from any station north of Elk River, Minn., until the extreme limit of the northern range was reached, at Oak Point, Manitoba, May 12. It was noticed in 1884 that the Whippoorwill was not reported from Nebraska and Dakota. In 1885 no reports come from these States nor from Kansas. In the fall of 1885 the last was seen at Mount Carmel, Mo., September 20.

418. **Phalænoptilus nuttalli** (Aud.). [355.] *Poor-will.*

The scarcity of the preceding species on the Plains has been mentioned. Its place there is taken by the present species, which is a rather common summer resident in Texas, Kansas, Nebraska, and Dakota, passing eastward, even to Grinnell, Iowa, where an accidental visitant was taken in 1880. In southeastern Dakota Dr. Agersborg recorded it as common, but gave no date for its arrival. In the spring of 1884 it was seen at Mason, Texas, April 8, and at Manhattan, Kans., May 6. It proceeds north to about latitude 48°, and winters near our southern border.

In the spring of 1885 the first Poor-will was noted at San Angelo, Tex., March 26. It arrived at Manhattan, Kans., April 15, but the next was not seen there until May 4. In the meantime it had been seen at Emporia, Kans., April 27.

Phalænoptilus nuttalli nitidus Brewster. [——.] *Frosted Poor-will.*

This handsome subspecies has been recently described by Mr. Wm. Brewster, from specimens taken on the Nueces River, in Texas (Auk. Vol. IV, No. 2, April, 1887, pp. 147–148).

419. Nyctidromus albicollis (Gmel.). [356.] *Parauque.*

A tropical American species, coming north to the valley of the Lower Rio Grande, in Texas, where it is a common summer resident (Sennett & Merrill).

420. Chordeiles virginianus (Gmel.). [357.] *Nighthawk.*

The Nighthawk winters south of the United States, and breeds throughout most of the Mississippi Valley east of the Plains, but principally in the northern portion, very few remaining in summer south of the parallel of thirty-seven degrees. It is a common summer resident in middle and eastern Kansas (Goss).

In the spring of 1884 the earliest date received of the appearance of the Nighthawk within our borders was April 20, when it was seen at Waverly, Miss. (latitude 33° 34′). Since it arrived at Oak Point, Manitoba (latitude 50° 30′), May 25, its average speed was very high, reaching 34 miles a day. A computation based on the same rate of speed indicates that the species reached the Gulf coast of Mississippi about April 14. The Nighthawk was recorded from latitude 39° in Missouri and Illinois April 29 and 30, and May 3 from latitude 39° 27′ and 40° 08′ in Illinois. May 6 and 8 it appeared in Illinois and Iowa, in the neighborhood of latitude 41° 30′, with a stray bird at latitude 43° 15′, and also at Manhattan, Kans. (latitude 39° 12′). May 12 and 13 found it at latitude 43° 43′ in Minnesota, and latitude 43° 06′ in Wisconsin, and May 16 and 17 carried it over all the country south of latitude 54° 25′. It reached Argusville, Dak. (latitude 47° 08′), May 23, and was noted from Oak Point, Manitoba (latitude 50° 30′), May 25.

In the fall of 1884 the last Nighthawk was seen at Williamstown, Iowa, August 26; at Des Moines, Iowa, September 15; at Mount Carmel, Mo., September 27. The bulk left Des Moines September 10, and Mount Carmel September 21. While the advance of this species in 1884 was quite regular, in 1885 there were unexplainable idiosyncracies. It reached the southern border of the United States the same day as in 1884, namely, April 14 (at Houma, La.). It was reported from San Antonio, southern Texas, April 15; from Corinth, Miss., April 22; Bonham, Tex., April 29; Saint Louis, Mo., April 30; and May 2, 3, and 4 from Reeds and Mount Carmel, Mo., Odin and Rockford, Ill., Keokuk, Iowa, and Ellsworth and Emporia, Kans. Thus far all the notes were somewhat regular, but four notes were contributed which certainly are extraordinary. They are: Grinnell, Iowa, first seen

April 21; next, April 22; common, April 26; Iowa City, Iowa, first seen April 22; Leeds Centre, Wis., first, April 21; next, April 24; Luck, Wis., first, April 28; next, April 30; common, May 11. The high character of the observers, and the commonness and unmistakability of the Nighthawk, render it hardly possible that there can be any mistakes in the observations, which by their very number substantiate one another. And it must be remembered in this connection that the temperature during the night of April 21 was high enough to inspire migration in any of the heat-loving species. At 11 p. m., April 21, the thermometer registered 62° F. at Saint Paul and 69° F. at Davenport. The next warm wave reached the Upper Mississippi Valley April 28. The rest of the notes are quite regular. The first Nighthawk reached Peoria, Ill., May 6; Aledo, Ill., May 11; and May 14, 15, and 16 the first was recorded from Unadilla, Nebr.; Des Moines, Iowa; Waukon, Iowa; Lake Mills, Wis.; Milwaukee, Wis.; New Cassel, Wis.; La Crosse, Wis.; Durand, Wis.; River Falls, Wis.; Rochester, Minn., and Elk River, Minn. May 19 it was reported from Heron Lake, Minn.; May 20 from Linwood, Nebr., and Huron, Dak.; May 23 from Argusville, Dak.; Menoken, Dak.; Two Rivers, Manitoba, and Oak Point, Manitoba, though at this last place it had been first noted May 19.

In the fall of 1885 the last was seen at Elk River, Minn., September 20; at River Falls, Wis., September 15; Lanesboro, Minn., September 18; Grinnell, Iowa, October 10; Iowa City, Iowa, September 20; and Fayette, Mo., September 19. The first was seen at Gainesville, Tex., October 6, and the last November 27. At Saint Louis, Mo., migration began August 17. Great movements were noted during the evenings of August 21 to 23, and again August 27. Fifty were seen going southeast at 5 p. m., September 15, and the last passed October 3.

420 *a.* **Chordeiles virginianus henryi** (Cass.). [357 *a.*] *Western Nighthawk.*

A common summer resident in western Manitoba and the Great Plains; common in middle and western Kansas (Goss). The records of this subspecies, which is the form inhabiting the dry western Plains, indicate quite a regular migration. In the spring of 1884 it was reported from Gainesville, Tex., April 29; Darlington, Ind. Ter., May 4; Ellsworth, Kans., May 9; Ellis, Kans., May 10; and Menoken, Dak., May 23. These records indicate that the species performed its northward migration in the spring of 1884 at the high rate of 34 miles a day for a distance of upwards of 900 miles. Few species exceed the present in the extent of its wanderings, its migrations extending nearly 4,000 miles—from Brazil to the Arctic regions. It is found as far east as Vermillion, in southeastern Dakota, where it is a common summer resident, and where the eastern Nighthawk occurs in migration only. In the spring of 1885 the only record received concerning the Western Nighthawk was its arrival at San Angelo, Tex., April 28. Mr. Lloyd says it probably breeds on the plains in Texas. Several specimens have been recorded from as far east as Waukegan, Ill. (Nelson).

421. Chordeiles texensis Lawr. [358.] *Texan Nighthawk.*

A southern species, occurring from Texas to southern California and southward. In 1884 it arrived at Mason, Tex., April 26. At San Angelo, Tex., five nests were found from May 14 to May 29, each containing two eggs. In southeastern Texas (near Houston) it is a regular summer resident (Nehrling).

423. Chætura pelagica (Linn.). [351.] *Chimney Swift.*

A common summer resident in Manitoba and the Mississippi Valley. From its unknown winter home, somewhere south of the United States, the Chimney Swallow, in the spring of 1884, crossed our border in March, arriving at Rodney, Miss., March 13, but it was not noticed at Abbeville, La., which is on a prairie, until March 25. No records of it were received while it was performing the next 400 miles of its journey; but on April 14 it appeared all along the line of latitude 39° in Illinois and Missouri. April 20 it was reported from latitude 40°, and May 1 from several stations near latitude 41° 30′. On the same day it was also reported from Minneapolis, Minn., and Green Bay, Wis. These latter, however, were doubtless records of impetuous birds that had flown far ahead of their fellows, and the whole of the next week was required to distribute the species over the region they had crossed so hurriedly. The advance reached Portage La Prairie, Manitoba, May 17. An average of all the notes received indicates that the bulk traveled about one week in rear of the van.

In the fall of 1884 the last Chimney Swift was seen at Mount Carmel, Mo., October 5, while the bulk left September 21.

In the spring of 1885 the first Swift was noted at Houma, La., March 21. It probably reached that point some days before, since it arrived at Saint Louis, Mo., ten days later (March 31), and this distance of 700 miles is more than this species usually travels in that time. Six days elapsed after the first was seen at Saint Louis before it was observed at any other station, and then at two places on opposite sides of Saint Louis, and both much farther south, namely, Corinth, Miss., and Bonham, Tex. April 15 to 17 the bulk arrived at Saint Louis, and during the same period the first was noted from Shawneetown, Paris, and Griggsville, Ill. The next advance took place April 21 and 22, bringing the species to Emporia and Manhattan, Kans., Linwood, Nebr., Des Moines, Iowa, Griggsville, Ill., and Hennepin, Ill. At the following places in Iowa, in the same latitude, they were not seen until five days later: Coralville, Grinnell, and Ames. Then came a long rest, extending to May 13 and 14, when, with the returning warm weather, they appeared at Chicago, Ill., Delavan, Wis., Milwaukee, Wis., Stoughton, Wis., Lake Mills, Wis., River Falls, Wis., Lanesboro, Minn., and Elk River, Minn. Much attention was paid to the movements of this species at Saint Louis by Mr. Widmann, who counted the number which, at evening, entered a certain tall chimney that for years has been a favorite resting place. The whole record from Saint Louis is:

March 31, first came two small parties at 6 p. m.; April 1, one going north, two enter the chimney; April 4, four enter; April 5, seven; April 15, thirty; April 17, one hundred and thirty; April 20, one hundred and fifty; April 26, two hundred and six; May 8, four hundred; May 12, one hundred and forty; May 15, fifty; May 16, transients are gone and summer sojourners are building.

In the fall of 1885 the last was reported from Elk River, Minn., September 7; Grinnell, Iowa, September 10; Iowa City, Iowa, September 12; Mount Carmel, Mo., September 20; Saint Louis, Mo., October 17; Shawneetown, Ill., October 19; and Bonham, Tex., September 26.

The full fall record from Saint Louis is as follows:

Date.	Movement.	Date.	Movement.
Aug. 17	311 enter chimney.	Oct. 3	100 enter chimney.
" 19	600 enter chimney.	" 7	Many in air.
" 26	600 enter chimney.	" 11	175 enter chimney.
" 29	600 enter chimney.	" 15	175 enter chimney.
" 30	400 enter chimney.	" 16	88 enter chimney.
Sept. 9	At 11 a. m. large troops go south.	" 17	Last seen.
" 18	300 enter chimney.		

425. Micropus melanoleucus (Baird). [349.] *White-throated Swift.*

A western species, taken once in Texas by Heermann (B. B. & R. Land Birds, Vol. II, p. 425).

428. Trochilus colubris Linn. [335.] *Ruby-throated Hummingbird.*

Breeds from Manitoba to the Gulf of Mexico. Breeds commonly as far west as Tom Green County, Tex. It is not probable that the Ruby-throat is ever found in the United States in winter. A queried reference from Florida has been received, and Mr. Bibbins, of Mermenton, La., states that he thinks he saw one at that place the last of January or first of February, 1884. In the spring of 1884 the Hummingbird appears to have entered the United States during the last week in March, when it was seen at Rodney, Miss., and Mason, Tex. April 3 and 4 it was reported from Yazoo City and Waverly, Miss., after which, excepting an irregular occurrence at Danville, Ill., April 28, nothing more was heard of it until the van reached Saint Louis, May 5. May 13 it had moved to latitude 43° in Wisconsin, and 43° 15′ in Iowa. May 18 it was reported from the most northern stations of Wisconsin, and in Minnesota up to latitude 46° 33′. May 25 it was seen at Oak Point, Manitoba. And even here these tiny creatures, some of whom spent the winter in Brazil, had another five hundred miles to go before reaching the northern limit of their range.

In the fall of 1884 the last was seen at Williamstown, Iowa, August 23, and at Des Moines, Iowa, September 27. The last left Mount Carmel, Mo., October 5, although the bulk left September 15.

In the spring of 1885 the first Ruby-throated Hummingbird was recorded from San Antonio, Tex., April 1. This was followed by its arrival at Bonham, Tex., April 7; Shawneetown, Ill., April 20; Fayette, Mo., April 25; and Odin, Ill., April 27. The rest of the notes were irregular. The first at Iowa City, Iowa, was noted May 1; at Pierce

City, Mo., May 2; at Paris, Ill., May 3; at Grinnell, Iowa, Saint Louis, Mo., and Hennepin, Ill., May 4; at Peoria, Ill., May 6; at Waukon, Iowa, May 13; at Coleta, Ill., and La Porte City, Iowa, May 15; at Keokuk, Iowa, Lake Mills, Wis., and Lanesboro, Minn., May 16; at Rockford, Ill., and Elk River, Minn., May 17; at Chicago, Ill., New Cassel and Luck, Wis., May 19 and 20. The arrival of the first at Shell River, Manitoba, was noted June 3.

In the fall of 1885 the last was reported from Lanesboro, Minn., September 28; Grinnell, Iowa, September 16; Iowa City, Iowa, August 11; Fayette, Mo., October 10; and Mount Carmel, Mo., August 2. The last female was reported from Bonham, Tex., October 16, while the males had left some time in August. At Saint Louis, Mo., they were numerous September 26; the bulk left September 29, and the last was seen October 11.

429. **Trochilus alexandri** Bourc. and Muls. [336.] *Black-chinned Hummingbird.*

This western Hummer comes east to central Texas, where it was reported to be a common summer resident in Mason, Concho, and Tom Green Counties. In 1878 it was taken in Gillispie and San Saba Counties, Tex., by Mr. Ragsdale (Bull. Nutt. Ornith. Club, Vol. IV, 1879, p. 60). And a single male was killed by Mr. N. C. Brown at Boerne, Tex., April 5, 1883. At San Angelo, in the spring of 1884, it was not observed till April 16, but since its nest and two eggs were found there four days later (April 20) the species must have been present for some time before it was noticed.

In the spring of 1885 it was reported as arriving at San Angelo April 2; at San Antonio, April 7; and at Mason, April 11. At San Antonio a nest with two eggs was found April 28, and at San Angelo a nest with five young, May 13.

432. **Trochilus platycercus** Swains. [339.] *Broad-tailed Hummingbird.*

A Rocky Mountain Hummer, migrating south to Guatemala in winter. It was taken at El Paso, Tex., by Mr. J. H. Clark, in 1851 (B. B. & R. Land Birds, Vol. II, p. 463).

435. **Trochilus heloisa** (Less. & DeLatt.). [342.] *Heloise's Hummingbird.*

This species inhabits eastern Mexico and southern Texas. One specimen (♀) was taken at El Paso by Mr. Clark.

438. **Amazilia fuscicaudata** (Fraser). [345.] *Rieffer's Hummingbird.*

An inhabitant of Central America and eastern Mexico, coming north to the valley of the Lower Rio Grande, in Texas, where it was taken by Dr. Merrill.

439. **Amazilia cerviniventris** Gould. [346.] *Buff-bellied Hummingbird.*

An inhabitant of eastern Mexico, coming north to the valley of the Lower Rio Grande, in Texas, where Dr. J. C. Merrill found it a common summer resident.

442. Milvulus tyrannus (Linn.). [302.] *Fork-tailed Flycatcher.*

A tropical American species, accidental in the United States. Recorded by Audubon from Mississippi and Kentucky.

443. Milvulus forficatus (Gmel.). [301.] *Scissor-tailed Flycatcher.*

The true home of the "Texas Bird of Paradise" is from Texas to Central America. In summer it occurs regularly in Indian Territory and Kansas. In southern Kansas it is a tolerably common summer resident (Goss). Accidental stragglers have been recorded from as far north as Manitoba and Hudson Bay. In the spring of 1884 the first arrivals spread over the whole of the northern part of Texas during the last week of March. In Indian Territory they appeared at Caddo April 11 and at Darlington April 9. The bulk reached Eagle Pass, Tex., April 1, and three days later they were numerous at San Angelo, where they were breeding from May 6 to July 16. Clutches of four, five, and six eggs were found.

In the fall of 1884 a flock of transient Scissor-tailed Flycatchers was seen at San Angelo October 1. The last was seen there October 6. At Portage la Prairie, Manitoba, Mr. Nash found one "lying dead on the prairie" in October.

In the spring of 1885 none but Texas observers reported its arrival. It reached San Angelo March 14; Bonham March 28, and Gainesville March 31. It was noted also at Eagle Pass, San Antonio, and Mason. In the fall of 1885 the last was seen at Bonham October 5, and at Mason October 11.

444. Tyrannus tyrannus (Linn.). [304.] *Kingbird.*

A common summer resident throughout Manitoba and the Mississippi Valley. Even as far south as Houston, Tex., it breeds abundantly; but in the valley of the Lower Rio Grande it is a migrant only (Sennett & Merrill). At Brown's Valley, on the border between Minnesota and Dakota, it is so abundant that Roberts and Benner found twenty-five nests in one day (June 17, 1879), "all containing full sets of perfectly fresh eggs." (Bull. Nutt. Ornith. Club, Vol. V, 1880, p. 15.)

This species will be treated with reference to the influence which the atmospheric warm and cold waves had upon its movements. In studying the weather reports of the Signal Service it is found that a succession of cold and warm waves pass over the Mississippi Valley. They begin in the northwest and pass eastward and southward. This is true of the warm waves as well as the cold. The common idea that a warm wave begins in the south and passes northward is wrong; it begins in the north and passes southward. For example, on the night of May 15, 1884, a warm wave began at Custer, in the Rocky Mountains. At 11 p. m. the temperature was 70° Fahr., while at Memphis, Tenn., several hundred miles farther south and east, it was seven degrees colder (the mercury standing at 63°). This warm wave reached the Missouri River at Yankton and Omaha on the night of May 16, the Mississippi at Keokuk and St. Louis May 17, and by the next night it had extended to Cairo and Memphis. The maximum heat did not reach Vicksburg until the night of May 19. Thus this warm wave was four days in passing from the Rocky Mountains to Vicksburg. Before it had reached the Gulf States another cold wave had already started in the northwest. May 17, at Custer, Mont., the temperature was reduced to 53°. This cold wave, also passing south and east, reached Vicksburg May 20, the next night after the warm wave. In this way waves are constantly passing, and their influence on the migration of birds is very marked.

The Signal Service reports show that a warm wave culminated in the Lower Mississippi region on the night of March 30. The next day the first Kingbird noted in the spring of 1884 was seen at Rodney, Miss., (latitude 31° 52′). (It was reported that a few remained all winter at latitude 29° 57′ in Louisiana, as indeed they do throughout most of the Gulf States.) For the next ten days there was no general or widespread atmospheric wave. The northern half of the Mississippi Valley was visited by short snow-storms followed by still shorter periods of sunshine, while the weather in the southern part was of an indeterminate character. During this period, and after a night when the temperature was scarcely above freezing, the first Kingbird was noted from latitude 37° 08′ in Missouri. There is no reason for challenging the record, for in so well-known a bird there is little chance of erroneous identification. But the probability is that the bird really arrived the night before, when the temperature was nearly fifteen degrees warmer, and escaped detection. However that may be, it is evident that very little movement took place until the advent of the warm wave which started in the Rocky Mountains on the 12th of April and was very pronounced in the Lower Mississippi Valley during the nights of the 13th and the 15th, the temperature being 29 degrees warmer than a few nights before. This renewed the advance and brought the first Kingbirds to latitude 33° 34′ in Mississippi on the 15th, and to latitude 33° 36′ in Texas on the 16th. After a decided but short cold wave another warm wave passed over most of the Mississippi Valley on the night of April 17. It brought three males to Saint Louis, and the next day the bulk was reported from latitude 37° 08′ in Missouri. A few days later two notes were received from Illinois, just opposite Saint Louis. It may be that the birds came during the slight rise of temperature during the night of April 21, but it is more probable that they came on the night of the 17th and were not noticed until later. The next note in order of latitude is that from latitude 36° 56′ in Missouri, where the first was not recorded till April 25; but since a station in latitude 37° 08′ in Missouri, only a few miles distant, had previously reported both the first and bulk, it may be considered that the species was accidentally overlooked until long after it had arrived.

On April 25 a warm wave was at its height at Yankton and Omaha, arriving at Saint Louis the next day. This wave was the culmination of six days of constantly increasing warmth, and started the birds before it had reached its maximum. April 25, first arrivals were reported from latitude 41° 22′ in Nebraska, and April 26 an increase of summer residents, with the first flock of transients, was recorded at Saint Louis—at both places the day before the maximum of temperature. The night of the maximum (April 27) brought "firsts" to latitude 39° 43′ and latitude 40° 08′ in Illinois. A record was made at latitude 42° 16′ in Illinois on April 28, but as this was the day after a quite pronounced polar wave it is probable that the birds came the day before with the maximum wave, and had escaped observation. The same remark applies to two records from latitude 40° 47′ and 40° 53′, April 28 and 29, which probably belong to April 26. The largest wave of the season began at Custer, Mont., April 28, passed Yankton and Saint Paul, and extended down the Mississippi to Saint Louis on the 29th, and reached the Lower Mississippi Valley on the 30th. As in the case of the previous wave, a slight bird movement took place the day before, bringing the first Kingbird to latitude 39° 14′ in Missouri, the bulk to latitude 39° 43′ in Illinois, and flocks of transients to latitude 38° 40′ in Missouri. But the next night witnessed the grand movement, which carried the species to latitude 41° 05′, 41° 26′, 41° 38′, 41° 40′, and 42° 37′ in Iowa, and latitude 39° 19′, 41° 36′, 41° 46′, 41° 58′, and 42° 37′ in Illinois. Hence it appears that between darkness and daylight there was a solid advance of Kingbirds over 200 miles of territory. Who shall say how many, many thousand were winging their way northward through the silent watches of that night? The notes of May 1 from latitude 41° 14′ in Iowa undoubtedly also belong to this wave. The night of May 1 was cold throughout the northern half of the Mississippi Valley, and was followed two days later by a warmer period, which marked another advance of Kingbirds to latitude 43° 06′. In this wave there was no such uniformity of movement as in the preceding. Indeed, out of the seven notes which have been apportioned to it, only two hit the maximum exactly; but considering them all to pertain to this wave, the advance is found to be at latitude 43° and 43° 06′ in Wisconsin, and latitude 43° 43′ in Minnesota, with the bulk at latitude 39° 12′ in Illinois and latitude 41° 14′ in Iowa. The culmination of the next wave extended from May 8 in the northwest to May 10 in the southeast. During the five days of preparation for this wave there were no notes. On the day preceding, the bulk arrived at latitude 42° 56′ in Dakota; the first at latitude 44° 22′ in Wisconsin and at latitude 45° in Minnesota, while on the day of the maximum "firsts" were recorded at latitude 43° 43′ and 44° 30′ in Wisconsin, latitude 44° 32′ in Minnesota, latitude 38° 55′ in Kansas, and latitude 47° 08′ in Dakota, with new arrivals of bulk at latitude 43° 06′ in Wisconsin and 41° 36′ in Iowa. Thus there was nearly as much real advance during these nights as during the last wave of April, the difference being that the April wave spread over all the stations during the same night, while the present wave occupied two nights. For the next three days there were six notes from the Upper Mississippi Valley, which probably belong to this wave, though the next two nights after the maximum were also warm and the birds very likely did some migrating. These six do not indicate any advance beyond previous records, but are the filling in from stations in the rear which had not before reported.

Another wave occurred on the night of May 17, but all the notes received on Kingbirds were made the previous day, which was also warm. These records mark the arrival of the bulk at latitude 43° in Wisconsin, and of the first at latitude 46° 33′ in Minnesota, while—and the fact is significant—it marked, as it should, the last transients seen at Saint Louis, for certainly all lasts should be seen just before the maximum of a warm wave.

But few waves remain in which the Kingbird is concerned. One on May 20 brought the bulk to latitude 43° 48′ and 46° 33′ in Minnesota, and the first to latitude 46° 58′ in Dakota, and lastly, on June 3, the first appeared at Oak Point, Manitoba (latitude 50° 30′). To recapitulate, 76 observations were contributed on the movements of the Kingbird. Of these, 12 were made on the day before the maximum; 10 the day after the maximum; 9 exactly at the minimum, that is, when the polar wave was at its height; 4 are evidently mistakes in identification, and 8 occurred at intermediate times when there was no decided wave either cold or warm. This leaves 33 notes which agree exactly with the maximum of the warm waves. It is perfectly natural that when a warm period is gradually increasing the birds should be influenced by it before it reaches the maximum, so that the first 12 records spoken of may be considered correct. Omitting the four mistakes, 72 records remain, of which 11 per cent. are indeterminate, 28 per cent. do not agree with the waves, and 61 per cent. agree exactly.

Considering the lack of experience in noting migration on the part of most of the observers, this is a very creditable showing.

The average speed at which the Kingbird migrates has been calculated in the light of the above-mentioned cold and warm waves. It has been assumed that no movement took place during the nights of pronounced cold waves, and also that none occurred until at least the day before the maximum, with the exception of the indeterminate times on which there were notes. The record began at latitude 31° 52′ in Mississippi March 31, and ended at latitude 59° 30′ in Manitoba June 3. The species thus passed over 1,286 miles in sixty-four days, which gives an average of twenty miles a day. Subtracting the nights of no movement, but retaining all the nights on which there was any possibility of movement, we find that there were thirty-two nights on which migration might have taken place, which would give an average of forty miles a night. That the above estimate of the number of non-movement nights is not too high may be seen from the records at

Saint Louis, where there were only about twenty-seven nights from March 31 to June 3 on which migratory movements took place; and it is safe to assume that the favorable nights as far north as Minnesota would have been fewer than at Saint Louis. Hence it is probable that on no night during which Kingbirds moved did they go less than forty miles, while on the night of April 29 they traversed over two hundred miles, and on the nights of May 9 and 10 more than a hundred miles each night.

If each station had furnished a record (similar to that kept by Mr. Widmann at Saint Louis) of all the nights when decided bird movements took place, when slight movements took place, and when no movement occurred, the advance of the various species could be calculated with great accuracy, and a long step forward would have been made in our knowledge of the phenomena of migration.

In the fall of 1884 the bulk left Williamstown, Iowa, August 20, and the last was seen there August 28. At Des Moines, Iowa, the last was seen August 26.

In the spring of 1885 the earliest record of the presence of the Kingbird in the Mississippi Valley came from Houma, La., where it was seen March 19. At Gainesville, Tex., 4 degrees farther north, the first was seen April 10; at Reeds, Mo., April 13; Shawneetown, Ill., April 16, and Odin, Ill., April 19. April 19 was the date of the beginning of the most pronounced warm wave which occurred in the Mississippi Valley during the whole season of migration. The rising temperature was first felt at Saint Vincent, Minn., the evening of April 18, and reached the maximum at New Orleans, La., the night of April 22. Its intensity may be judged from the fact that at La Crosse, Wis., the temperature at 11 p. m., April 17, was 38°, while the next night it was 58°; at Keokuk the temperature rose from 42° on the 17th to 68° during the night of the 21st. Of course, this great rising temperature sent a large bird-wave northward. The Kingbird was prominent in this wave, traveling in company with the Whippoorwill, Brown Thrasher, and many others. Now it is a queer fact that, although this bird-wave was plainly noticed at every station in southern Iowa and central Illinois, yet each station reported a different set of birds out of the ten or a dozen well-known species which there is good reason to believe were then migrating together. Thus, for example, during spring migration in 1885 the three birds already mentioned, namely, the Kingbird, Brown Thrasher, and Whippoorwill, were all reported from the following thirteen stations: Griggsville, Aledo, and Hennepin, Ill., and Morning Sun, Ferry, Knoxville, Des Moines, Iowa City, Coralville, Newton, Grinnell, Ames, and La Porte City, Iowa. During the five days from April 19 to April 23 the Kingbird was reported from six of these stations, the Brown Thrasher from eleven, and the Whippoorwill from nine. One station reported the Brown Thrasher only, and another the Kingbird only. The Kingbird and Brown Thrasher, without the Whippoorwill, were reported by two stations; the other two without the Kingbird by six stations, and one station reported the Kingbird and Whippoorwill without the Brown Thrasher. At two stations all three were seen. Now what conclusions can be drawn from these facts? It is evident that the peculiarity of the records must be due to irregularity of migration or to irregular or incomplete observation, and it is probable that both causes affect the result. These records show also how necessary it is, in studying migration, to have notes from a large number of stations. The seven of the above mentioned stations which did not report the Kingbird by April 23 recorded its arrival the following number of days afterwards, namely, one, fourteen, nine, six, eight, four, and twenty days, respectively.

Returning again to the regular migration of the Kingbird, the records show that it was seen at Odin, Ill., April 19; the next day at Saint Louis and Glasgow, Mo.; April 21 at Mount Carmel, Mo., and Manhattan, Kans.; April 22 and 23 at Paris and Hennepin, Ill., and Ferry, Coralville, Knoxville, and La Porte City, Iowa.

Although this same warm wave carried the Whippoorwill and the Brown Thrasher a full hundred miles farther north than any of these stations, no further advance of the Kingbird was noted during the rest of the month. Its advance from the region where the last wave left it to latitude 45° seems to have taken place in two separate flights, about a week apart, both passing over the same country. And since the interval between these two flights was occupied by snow-storms and freezing weather, it may be inferred that the advance-guard of Kingbirds had encountered the cold wave, which delayed the arrival of any other detachments until the weather moderated. The stations visited by the scouts on May 4 and 5 were Batavia, Ill., Delavan, Wis. (where it was first seen May 1), Stoughton, Wis., Lake Mills, Wis., New Cassel, Wis., Rochester, Minn., Excelsior, Minn. (first seen May 2), and Minneapolis, Minn. The second detachment was noted from May 11 to 13 at Batavia, Ill. (common); Rockford, Ill. (common); Lake Mills, Wis. (bulk arrived); Leeds Centre, Wis. (first); Ripon, Wis. (first); River Falls, Wis. (first); Ames, Iowa (first); Williamstown, Iowa (first); Waukon, Iowa (first); Lanesboro, Minn. (first); Heron Lake, Minn. (first); Lake City, Minn. (first), and Huron, Dak. (first). The first at Elk River, Minn., was seen May 14; at New Richmond, Wis., May 15; at Menoken, Dak., May 17; Two Rivers, Manitoba, and Oak Point, Manitoba, May 21. The two notes from Nebraska (Unadilla April 27 and Linwood May 2) agreed very well with records from both Kansas and Dakota.

In the fall of 1885 the last Kingbird was reported from Elk River, Minn., September 1; Grinnell, Iowa, August 4; Saint Louis, Mo., August 18; Mount Carmel, Mo., September 17; and Bonham, Tex., October 17. In Concho and Tom Green Counties, Tex., it is a rather rare fall visitant.

445. Tyrannus dominicensis (Gmel.). [303.] *Gray Kingbird.*

The Gray Kingbird is a tropical species, a few coming north regularly to the Gulf States to breed.

446. Tyrannus melancholicus couchii (Baird). [305.] *Couch's Kingbird.*

A tropical American species, coming north to southern Texas. Its nest and eggs have been taken at Lomita Ranch, on the Lower Rio Grande (Sennett).

447. Tyrannus verticalis Say. [306.] *Arkansas Flycatcher; Western Kingbird.*

A western species occurring in the western row of States in our district. It was ascertained to breed in western Minnesota by Thomas S. Roberts and Franklin Benner, who found two of its nests in the Traverse Lake region in June, 1879 (Bull. Nutt. Ornith. Club, Vol. V, 1880, pp. 15–16). It is common in middle and western Kansas (Goss); has been taken in Texas, in Kansas as far east as Fort Hays, and in both southwestern and southeastern Nebraska; is a rare summer resident in southeastern Dakota; abundant in central Dakota, and has occurred accidentally in Iowa, the District of Columbia, Maine, New Jersey, and New York. In 1884 few notes were contributed relating to its movements during the spring migration. It was seen at San Angelo, Tex., and Vermillion, Dak., during the first week in May, and at Ellis, Kans., May 22.

In the spring of 1885 the first Arkansas Flycatcher was seen at San Angelo, Tex., May 6, the next May 8, and the last May 18.

448. Tyrannus vociferans Swains. [307.] *Cassin's Kingbird.*

A southwestern species, recorded from western Texas.

449. Pitangus derbianus (Kaup). [308.] *Mexican Pitangus; Derby Flycatcher.*

An inhabitant of tropical America, coming north to the Lower Rio Grande Valley, in Texas, where it was found by Mr. Sennett, who procured several specimens near Lomita ranch, above Hidalgo.

450. Myiozetetes texensis (Giraud). [309.] *Giraud's Flycatcher.*

An inhabitant of tropical America, coming north to Texas (Giraud). Giraud's type is in the U. S. National Museum.

452. Myiarchus crinitus (Linn.). [312]. *Great-crested Flycatcher.*

A common summer resident of the Mississippi Valley; rare as far north as Manitoba. Winters extralimitally, entering our district in April. In the spring of 1884 it was recorded at Gainesville, Tex., April 13; Manhattan, Kans., April 26, and Burlington, Iowa, April 27. About the same time it was observed at Pierce City, Mount Carmel, and Saint Louis, in Missouri. The three stations near the thirty-ninth parallel reported the arrival of the bulk about May 1. By May 3 the van had advanced to central Iowa (latitude 41° 36′ and 41° 38′), while on the 10th, at West Depere, Wis., Mr. S. W. Willard shot the first he had ever seen in that neighborhood. The species seldom goes farther north than this. In Minnesota it has been traced up to latitude 45° and possibly a little further, but at latitude 47° I never saw it. It breeds throughout its United States range. In the fall of 1884 the last Great-crested Flycatcher was seen at Des Moines, Iowa, August 26. At Mount Carmel, Mo., the bulk left August 15 and the last September 9. The last left San Angelo, Tex., September 27.

In the spring of 1885 the earliest record was from Gainesville, Tex., where the species was seen April 9. It appeared at Saint Louis, Mo., April 21; Paris, Ill., April 22; Mount Carmel, Mo., April 23; Manhattan, Kans., May 4; Des Moines, Iowa, May 5, and Elk River, Minn., May 21. In the fall of 1885 the last left Grinnell, Iowa, September 26, and Saint Louis, Mo., September 21.

In Concho and Tom Green Counties, Tex., it is a summer resident, and is particularly abundant in fall migration; and at Houston, in eastern Texas, it is also a common breeder.

453. **Myiarchus mexicanus** (Kaup). [311.] *Mexican Crested Flycatcher.*

But one record of this Mexican species was received. Mr. Atwater found it a summer resident at San Antonio, Tex., where it arrived about the 1st of April in 1884. This point probably is not far from the northern limit of its range. Previously it was not known north of the valley of the Lower Rio Grande, where it is abundant.

454. **Myiarchus cinerascens** Lawr. [313.] *Ash-throated Flycatcher.*

This western Flycatcher reaches our district in Texas, where it is a summer resident. In the spring of 1884 the first male arrived at San Angelo March 23, followed three days later by the female; April 7 both sexes were numerous. Three nests were found May 9, May 19, and June 9. They contained clutches of four, five, and five eggs, respectively. The last noted in 1883 was on August 30.

In the spring of 1885 the first Ash-throated Flycatcher came to Mason, Tex., April 5, where they were common by April 10. At San Angelo, Tex., the first was seen March 15. They appeared at Bonham, Tex., April 22, and were common April 26. In the fall of 1885, at Bonham, Tex., the last was seen October 17.

455. **Myiarchus lawrenceii** (Gir.). [314.] *Lawrence's Flycatcher.*

An inhabitant of eastern Mexico, coming north to the Lower Rio Grande Valley, in Texas.

456. **Sayornis phœbe** (Lath.). [315.] *Phœbe; Pewee.*

This familiar bird is a common summer resident in the Mississippi Valley. In eastern Texas, near Houston, it is common in winter from December till March, but none remain to breed (Nehrling). In the spring of 1884 fifty observers reported the date of its first appearance. At the different stations there were great differences in the number of individuals seen. At one station they were reported as common, while at another, not far distant, they may have been very rare. Mermenton, La., near the Gulf coast, was the only station reporting it to be a permanent resident. Farther west, at San Angelo, Tex., a single bird was taken February 1, 1882. A single bird appeared at Gainesville, Tex., as early as February 27, 1884. At Caddo, Ind. Ter., one was seen March 8, and eleven days later the first arrived at Saint Louis, Mo. These were several males and females, the advance guard of the scattered army that moved northward a few days later.

The appearance of the Pewee at any locality is usually an indication that it will breed there. I have never yet seen a transient visitor in migration, and the notes received from the different stations confirm my opinion that they do not linger along the way while migrating. Whether their flight is maintained for long distances at a very great height, or whether they stop for rest and food, I do not know, but I have never seen any arrive in spring whose breeding locality was not easily found. True, I have known a pair to appear for a few days during warm weather and then disappear for a fortnight during a cold snap. But later the same birds returned and nested under the eaves of the old barn. They may have sought the shelter of some near forest or ravine, or may even have gone southward for a time during the cold weather. From March 20 to March 28, 1884, the great wave of migration occurred. During those eight days the species spread throughout Illinois, Wisconsin, Minnesota, Iowa, and Missouri. There does not seem to have been any regularity in this advance. The birds seem to have left their winter homes and to have passed directly to their breeding stands, where nesting began within a few days. Thus, at Newton, Iowa (latitude 41° 42′), they were building March 28.

On the western line of migration there was more delay in the advance. Thus on March 29 the first was seen at Pierce City (latitude 36° 56′); April 2 the first appeared at Manhattan, Kans. (latitude 39° 12′). April 7 they became common at Gainesville, Tex.; three days later were common at Manhattan. April 5 they were first seen at Fridley, Minn. (latitude 45° 05′). The last record of arrival was from Oak Point, Manitoba (latitude 50° 30′), where they are rare and were first seen May 15.

In the fall of 1884 the last Phœbe left Des Moines, Iowa, September 24. The bulk left Mount Carmel, Mo., October 1, while the last was seen there October 10. At Gainesville, Tex., the first came October 27.

In the spring of 1885 about half of the notes contributed on the Pewee mention its movements on two consecutive days, so that it evidently was migrating in great numbers at that time. Previously several dates were recorded, the earliest of which was its arrival at Fayette, Mo., March 4. It reached Shawneetown, Ill., March 5; Saint Louis, Mo., March 10 (and on the same date was seen the second time at Fayette); Richmond, Kans., March 11; Manhattan, Kans., and Glasgow, Mo., March 14.

During the next nine days no movement was recorded, which may be explained by the fact that from Saint Louis northward a second winter set in with the temperature below freezing almost every night.

From March 23 to March 29 the following scattered notes of "firsts" were made: Odin, Ill., March 29; Aledo, Ill., March 23; Keokuk, Iowa, March 29; Ferry, Iowa, March 28; Knoxville, Iowa, March 23; Des Moines, Iowa, March 24; Newton, Iowa, March 27; Tampico, Ill., March 25; Batavia, Ill., March 28; Rockford, Ill., March 23; Delavan, Wis., March 29; Lanesboro, Minn., March 29. The above records indicate that the van was so demoralized by the cold weather that its movements, when it did start again, were very irregular. The grand move, to which allusion has been made already, took place the last day in March and the first day in April. During these two days the arrival of the Pewee was recorded at Paris, Ill.; Peoria, Ill.; Hennepin, Ill.; Chicago, Ill.; Morning Sun, Iowa; Mount Pleasant, Iowa; Richmond, Iowa; Iowa City, Iowa; Coralville, Iowa; La Porte City, Iowa; Stoughton, Wis.; Milwaukee, Wis.; Leeds Centre, Wis., and Lake Mills, Wis. Following are the only notes contributed for the region north of the stations just enumerated: the species arrived at New Cassel, Wis., April 4; Lake City, Minn., April 4; Durand, Wis., April 5; Hastings, Minn., April 6; Elk River, Minn., April 6, and Oak Point, Manitoba, May 22.

In the fall of 1885 the last Pewee was reported from Elk River, Minn., September 28; from River Falls, Wis., September 27; Lanesboro, Minn., October 7; Grinnell, Iowa, October 17; Iowa City, Iowa, October 3; Mount Carmel, Mo., October 9; and Saint Louis, Mo., October 27. At Gainesville, Texas, the first was seen October 4 and the second November 27. In Concho County, Tex., it is rare in summer and winter, but common in fall (Lloyd).

457. Sayornis saya (Bonap.). [316.] *Say's Phœbe.*

Like the Phœbe of the east, this western bird is an early migrant. In our district it winters in Texas, ranging regularly as far east as the Colorado River (Lloyd). It occurs in eastern Texas, near Houston, in April (Nehrling). Near Fort Brown, on the Lower Rio Grande, in Texas, it is not uncommon in winter (Merrill), and Mr. Sennett took it at Lomita ranch in April. It proceeds north early in the spring. At Boerne, Tex., Mr. Brown saw several and secured two early in February, 1883, during a severe storm. Both were much emaciated. By March 18, 1884, it had reached Ellis, Kans., where it is a constant summer resident. Though not recorded by our observers from any station north of Kansas, yet it does go more than a thousand miles farther northward. On its southward journey it reached winter quarters at San Angelo, Tex., December 19, 1883, at which locality the last spring bird was seen April 22, though a few probably stay to breed in favorable localities. At Ellis, Kans., the bulk came April 18. Toward the east, in Texas, Mr. Ragsdale found it in Clay County in the spring of 1884, but has never seen it at Gainesville, in Cook County. It has been found by Mr. Powell and by others in southeastern Nebraska, and has occurred accidentally in northern Illinois, Wisconsin, and Iowa.

458. Sayornis nigricans (Swains.). [317.] *Black Phœbe.*

During the summer this southwestern species penetrates a short distance into western Texas. The only locality at which Mr. Lloyd has found it is along Spring Creek, in Tom Green County, where it is rare, but breeds. In the spring of 1885 it arrived at San Angelo, Tex., March 14, and was common there March 26. Three eggs were taken April 3 from a last year's nest which had been used a second time.

459. Contopus borealis (Swains.). [318.] *Olive-sided Flycatcher.*

Breeds from northern Minnesota northward and winters below our southern border. Col. Goss says it breeds in Kansas. Though occurring throughout the whole of the Mississippi Valley, this species seems to have almost escaped the notice of the observers. It was seen as a rare transient at Ellis, Kans., and the first was noticed at Lanesboro, Minn., June 2, 1884. In the spring of 1885 the first Olive sided Flycatcher was seen at Saint Louis, Mo., April 30; at Grinnell, Iowa, May 21; and at Lanesboro, Minn., May 18. The last was recorded from Saint Louis May 15; from Gainesville, Tex., May 21; and from Grinnell, Iowa, May 30. In the fall of 1885 the first migrant appeared at Saint Louis, Mo., September 14, and the last was seen there September 25. Mr. Lloyd states that in Concho and Tom Green Counties, Tex., it is a fall migrant, tolerably common in September.

461. Contopus virens (Linn.). [320.] *Wood Pewee.*

A common summer resident in Manitoba and the Mississippi Valley east of the Plains. This species was said by Audubon to winter in Louisiana, but has not been found there by late observers; neither were any notes contributed of its presence in the United States as early as the date of arrival given by Dr. Coues, who says that it enters our district in March. Still, as it reached Saint Louis April 29, 1884, and its average rate of travel is about fifteen miles a day, calculation shows that it ought to have reached the Gulf coast of Louisiana March 18. In the spring of 1884 our earliest date came from near the extreme western limit of its range, namely, Mason, Tex., where it was seen April 16. Farther north in Texas, it was observed at Gainesville, April 29, which is the same day at which it was seen at Saint Louis, three hundred and fifty-four miles farther north and still farther east. The average rate from Mason to Gainesville was about the same as that from Saint Louis to Waukon, Iowa, so that it is probable that the dates express very nearly the actual state of affairs, making it evident that migration along the western part of its habitat is much behind that in the eastern and middle portions. West of Mason the only record came from San Angelo, Tex., where the species was found to be an occasional visitant. Mr. Ridgway states that specimens sent to the Smithsonian Institution were not the western form (*C. richardsonii*), but the true eastern *C. virens.** Central Iowa was reached in migration May 10, northern

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*Since the above was written, Mr. Lloyd has taken two specimens of *Contopus richardsoni* in Concho County, Tex.

Iowa May 20, and southern Minnesota (at Lanesboro) June 2. The bulk was four or five days behind the van. The Wood Pewee is common in eastern Kansas and rare in western (Goss).

In the fall of 1884 the bulk of Wood Pewees was reported as leaving Williamstown, Iowa, August 24; Des Moines, Iowa, August 29; and Mount Carmel, Mo., September 10. The last was reported from Des Moines, August 29; from Mount Carmel, September 21; and from San Angelo, Tex., September 21.

In the spring of 1885 the first was recorded from San Angelo, Tex., March 14. Several weeks elapsed before the next record was made. At Gainesville, Tex., it was seen April 18; at Saint Louis, Mo., April 28; at Chicago, Ill, May 5; Des Moines, Iowa, May 15; Lanesboro, Minn., May 19; Heron Lake, Minn., May 20; Elk River, Minn., May 22, and Manhattan, Kans., May 16.

In the fall of 1885 the bulk was present at Saint Louis, Mo., September 25, although they were conspicuous September 22. The last was reported from Grinnell, Iowa, September 16; Fernwood, Ill., October 3; Saint Louis, October 5, and Bonham, Tex., November 10.

462. Contopus richardsonii (Swains.). [321.] *Western Wood Pewee.*

A western species. Common in western Manitoba (Seton); frequently seen in western Nebraska (Aughey); a rare summer resident in western Kansas (Goss). In Concho County, Tex., two were shot in the fall of 1886 (Lloyd).

463. Empidonax flaviventris Baird. [322.] *Yellow-bellied Flycatcher.*

Breeds in Manitoba, and doubtless in northern Minnesota also, and migrates through the entire length of the Mississippi Valley, wintering in Central America. The Yellow-bellied Flycatcher was not noticed by any of the observers near the Mississippi south of Saint Louis, though it must traverse that part of the United States in coming from its winter home. In the spring of 1884, at Saint Louis, it arrived May 8, and the next day it was seen at Des Moines, Iowa. May 23 it was seen at Chicago, and May 24 at Lanesboro, Minn. In the southwest the first female was shot at Gainesville, Tex., May 16.

In the spring of 1885 the first arrived at Saint Louis, Mo., May 13; Grinnell, Iowa, May 21, and Lanesboro, Minn., May 20. The last was seen at Saint Louis May 15 and at Grinnell May 23.

465. Empidonax acadicus (Gmel.). [324.] *Acadian Flycatcher.*

A common breeder in all but the northern and western parts of the Mississippi Valley. In eastern Texas (near Houston) it is the only *Empidonax* that remains to breed (Nehrling). The same is true of Southern Louisiana and Alabama (A. K. Fisher). As in the case of many other species, the earliest record of the Acadian Flycatcher in the spring of 1884 came from Saint Louis, where it arrived April 29. The other records are: latitude 39° 12′ in Kansas, May 10; latitude 41° 51′ in Illinois, May 21, and latitude 43° 43′ in Minnesota, May 28. The species is decidedly eastern, and not often found west of the Mississippi. Manhattan, Kans., is near the western limit of its range, and it is quite rare in all parts of Kansas, though it has been traced as far west as Ellis.

In the spring of 1885 the earliest record of the Acadian Flycatcher came from the extreme western limit of its range. It was seen at Gainesville, Tex., April 20. The other records are: Saint Louis, Mo., April 28; Tampico, Ill., May 5; Chicago, Ill., May 9, and Manhattan, Kans., May 20. It was common at Grinnell, Iowa, May 22. It breeds throughout its range. In the fall of 1885 it was last seen at Saint Louis September 14.

466. Empidonax pusillus (Swains.). [325.] *Little Flycatcher.*

Specimens taken by Mr. Lloyd and identified by Mr. Ridgway prove that this western species is a tolerably common breeder at San Angelo, Tex.

466a. Empidonax pusillus traillii (Aud.). [325a.] *Traill's Flycatcher.*

A common migrant in the Mississippi Valley; breeds from Missouri and southern Illinois northward. The earliest date of its migration in the spring of 1884 came from San Angelo, Tex., where it was seen April 27; but in corresponding latitudes near the Mississippi it must have appeared much earlier, since it was seen at Saint Louis, 500 miles farther north, April 29. The rest of the very few notes contributed on this species refer to its arrival at latitude 41° 51′ in Illinois, May 21; latitude 39° 12′ in Kansas, May 22, and latitude 43° 43′ in Minnesota, May 26.

In the fall of 1884 the last Traill's Flycatcher was seen at Mount Carmel, Mo., September 16, and San Angelo, Tex., September 1.

In the spring of 1885 the first was seen at Saint Louis, Mo., May 4, while at Gainesville, Tex., much farther south and west, none were reported until May 16. The first reached Mount Carmel, Mo., May 8; Des Moines, Iowa, May 15; Lanesboro, Minn., May 15; Delavan, Wis., and River Falls, Wis., May 16.

In the fall of 1885 the first Traill's Flycatcher noticed at Emporia, Kans., was seen August 27. The species was still numerous at Saint Louis, Mo., September 16, and was last seen September 25.

467. Empidonax minimus Baird. [326.] *Least Flycatcher.*

In the spring of 1884 the Least Flycatcher, like the Wood Pewee, already mentioned, was reported to have arrived on the same day (April 29) at Gainesville, Tex., and Saint Louis, Mo. Records were received from as far north as Oak Point, Manitoba, but they were too irregular for use.

In the fall of 1884 the last was seen at San Angelo, Tex., September 1.

In the spring of 1885 the reports of first arrivals were as follows: San Antonio, Tex., April 14; Gainesville, Tex., April 20; Saint Louis, Mo., April 30; Des Moines, Iowa, May 5; Hennepin, Ill., May 10; Lanesboro, Minn., May 5; Heron Lake, Minn., May 12; White Earth, Minn., May 16 (about forty seen during the day); Oak Point, Manitoba, May 22. In the fall of 1885 the first was seen at Saint Louis September 14 and the last October 14. The last was seen at Bonham, Tex., September 8.

The facts at present known seem to indicate something phenomenal in the breeding range of *Empidonax minimus.* It is an abundant summer resident throughout Manitoba and the northern States. Specimens (both adult and young) taken by Mr. Lloyd at San Angelo, Tex., during the breeding season have been examined by Mr. Ridgway and pronounced typical *E. minimus;* and Mr. Peters recorded it as breeding commonly in Bonham, Tex. Prof. Aughey states that it sometimes breeds in Nebraska. On the other hand, both Col. Goss and Prof. Lantz give it as a migrant only in Kansas; and Mr. Widmann positively states that it does not breed in Saint Louis, Mo., where, in 1885, it was last seen May 13.

468. **Empidonax hammondi** (Xantus). [327.] *Hammond's Flycatcher.*

The only truly Mississippi Valley record of this western species came from Dr. Agersborg, who reported it to be a rare summer resident at Vermillion, Dak. In Texas Mr. Lloyd has found it a tolerably common fall migrant in Tom Green County and rare in Concho County.

469. **Empidonax obscurus** (Swains.). [328.] *Wright's Flycatcher.*

This also is a western species, or rather southwestern, coming northward in the Rocky Mountains during the summer as far as latitude 49°. Mr. Lloyd has taken it twice in fall migration in Tom Green County, Tex.

470. **Empidonax fulvifrons** (Giraud). [329.] *Fulvous Flycatcher.*

This species is an inhabitant of eastern Mexico, coming north to Texas (Giraud). The type is in the U. S. National Museum.

471. **Pyrocephalus rubineus mexicanus** (Scl.). [330.] *Vermilion Flycatcher.*

A tropical species coming north to Texas. In the valley of the Lower Rio Grande it is a tolerably common resident, but more numerous in summer than in winter (Merrill).

472. **Ornithion imberbe** (Scl.). [331.] *Beardless Flycatcher.*

An inhabitant of Central America and eastern Mexico, coming north to the valley of the Lower Rio Grande, in Texas, where it was taken by Mr. Sennett.

474. **Otocoris alpestris** (Linn.). [300.] *Horned Lark; Shore Lark.*

This species breeds in northeastern North America and Greenland, wintering in the United States. During its southward journey it extends westward to the Mississippi Valley, where it is abundant in some parts of Illinois and rare in Kansas, but the limits of its winter distribution are not known. It visits Manitoba in October.

474 a. Otocoris alpestris leucolæma (Coues). [300 a.] *Pallid Horned Lark; White-throated Horned Lark.*

Breeds in the interior of British North America and Alaska, coming south in winter to Dakota, Nebraska, Kansas, and westward. (Known locally as Wheatear and Wheat Bird, and confounded by many with the Wheatear of Europe.)

474 b. Otocoris alpestris praticola Hensh. [—.] *Prairie Horned Lark.*

This subspecies and the following occur in the Mississippi Valley, where the present is the prevailing form east of the Plains, breeding abundantly in the northern half and south, at least as far as Kansas and Illinois, and wintering from latitude 43° southward even to Texas. It is abundant in eastern Kansas (Goss) and breeds in Manitoba.

474 c. Otocoris alpestris arenicola Hensh. [—.] *Desert Horned Lark.*

Inhabits the Rocky Mountain region and the Great Basin, coming east to Dakota, where it breeds at least as far east as Devil's Lake. It is a common resident in middle and western Kansas (Goss). In winter it is abundant in Concho and Tom Green Counties, Tex., arriving late in October and departing early in March (Lloyd).

474 d. Otocoris alpestris giraudi Hensh. [—.] *Texan Horned Lark.*

Inhabits eastern and southeastern Texas.

NOTE.—Owing to the want of exact knowledge concerning the breeding and winter ranges of the various subspecies of Horned Larks it is impossible at present to give their distribution more fully than has been done above.

Either the typical *O. alpestris* or variety *praticola* (probably the former) usually reaches northern Minnesota before the second week in February, though the mercury sometimes falls to forty degrees below zero afterwards. The northern limit of the winter range of the species, taken collectively, varies from latitude 42° to 44°, but a few individuals usually can be found along latitude 43° even in the coldest winters. In the winter of 1883–'84 they were unusually scarce in the north, and on March 1 but few had been seen north of latitude 43°. During the next two weeks they advanced to latitude 45°, and March 23 they were noticed at Two Rivers, Manitoba, latitude 49° 28′.

In the fall of 1884 the first migrant appeared at San Angelo, Tex., September 23, where it had become common by November 3.

In the spring of 1885 Horned Larks appeared at New Cassel, Wis., January 28; at River Falls, Wis., February 2; Lake City, Minn., and Elk River, Minn., February 26. Three individuals were seen at Moorhead, Minn., after a short spell of south wind, February 12. They were there continuously after that date. The first came to Larimore, Dak., March 18, and Oak Point, Manitoba, March 28.

In the fall of 1885 the first returning Lark came to Bonham, Tex., November 4, and they were common there by November 10. They appeared at Gainesville, Tex., November 2.

475. Pica pica hudsonica (Sab.). [286.] *Black-billed Magpie.*

Occurs in the western part of the Mississippi Valley as a rather rare visitant from the north or northwest. In western Manitoba Mr. Thompson records it as a rare and irregular resident. In western Kansas it is an occasional fall and winter visitant (Goss). Dr. Agersborg states that it used to be very common in winter about Vermillion, Dak., but has recently disappeared. In western Dakota it is still tolerably common. Robert Kennicott, writing in 1854, stated that the Magpie was "not uncommon in winter" in Cook County, Ill. (Trans. Ill. State Agl. Soc. for 1853–1854, 1855, p. 585.)

477. Cyanocitta cristata (Linn.). [289.] *Blue Jay.*

This species is resident throughout all of the Mississippi Valley and common in all parts except the western plains. In western Manitoba it is given as a summer resident (Seton). It is usually said to be non-migratory, because in most localities some individuals are present the whole year round. The bulk, however, performs quite a regular migration south in the fall and north late in the spring. In addition to this imperfect migration it roves somewhat in search of food. The bulk of its migrations in the spring of 1884 took place during the first two weeks of May, and the first one reached Oak Point, Manitoba, May 29. The Blue Jay is local in its distribution, requiring an abundance of acorns or other mast as a prime requisite for a breeding or wintering place. The following note from Heron Lake, Minn., shows how they are seen during migration at places where they do not breed: "May 14, one seen; in a few days they will be quite plenty and then they will disappear until fall." The Nueces Cañon in southwestern Texas is said to be the winter home of countless myriads. In that case they must migrate to the northeast, for all observers agree that in northwestern Texas they are rather a rare bird. Mr. Lloyd says that its western limit in Texas "seems to be near the mouth of the main Concho, where it is tolerably common." (The Auk, Vol. IV, 1887, p. 290.)

In the spring of 1885 flocks in migration passed Saint Louis, Mo., almost every day from April 21 to April 30; and again, May 12, a party of fifteen or twenty went north. The first returned to Shell River, Manitoba, May 15, and Oak Point, Manitoba, May 24. In the fall of 1885 the bulk of the flocks were reported from Saint Louis September 26. October 5 one troop was seen going south at 9 a. m.

480. Aphelocoma woodhousei (Baird). [292.] *Woodhouse's Jay.*

A bird of the west, occurring in our district in southwestern Texas. Mr. William Lloyd states that it is tolerably common in Concho and Tom Green Counties, Tex., where it is "resident wherever there is skin-oak, at the heads of nearly all the creeks." (The Auk, Vol. IV, 1887, p. 290.) Two nests were found.

483. Xanthoura luxuosa (Less.). [296.] *Green Jay.*

The Green Jay is an inhabitant of eastern Mexico, coming north to the Lower Rio Grande Valley, in Texas, where it is a common resident.

484. Perisoreus canadensis (Linn.). [297.] *Canada Jay.*

This is a northern bird, coming down in winter from the pine forests of Manitoba, Minnesota, and Wisconsin, where it is abundant. It has not been known to breed in Wisconsin, but breeds in northern Minnesota, where I found it in summer in the tamarack swamps.

486. Corvus corax sinuatus (Wagl.). [280.] *American Raven.*

A hundred years ago the Raven was found probably all over the Mississippi Valley, excepting perhaps in the Gulf States. Now civilization has driven it from most of the district, but it is still found locally in almost every State except Mississippi and Louisiana. In western Kansas it is resident and not uncommon (Goss). The migratory movement is too slight to be studied, and is dependent upon the food rather than the weather. At the mouth of Devil's River and the bend of the Rio Grande, in Texas, immense numbers pass the winter and disperse again in the spring. In western Texas its nest has been taken by Mr. Lloyd. In Manitoba it is a resident at some places and a winter visitant at others.

487. Corvus cryptoleucus Couch. [281.] *White-necked Raven.*

A southwestern species; common in western Texas. Resident in western Kansas, where it is rare in summer but common in fall and winter (Goss). Rare in Nebraska. Mr. Lloyd states that it is resident as far east as Tom Green and Concho Counties, Tex., where it is abundant at times. He says: "The bulk retire in fall in large flocks down the Pecos and Devil's Rivers, where they winter by thousands. A nest with six eggs was found May 19, 1882, in a low hackberry; another nest, partly finished, was found May 13, 1883; and a third, with three eggs, May 5, 1885, in low mesquites."

488. Corvus americanus Aud. [282.] *Common Crow.*

Common in name and common by nature, the Crow is a common summer bird over all of Manitoba and the Mississippi Valley, and common in winter from northern Iowa southward. In winter it is especially numerous at Pierce City, Mo., where Mr. Nehrling says that thousands spent the night near his house, and is still more abundant at Saint Louis, where its numbers, after the increase of the first half of January, reached near fifty thousand. The most northern record in the winter of 1883-'84 was at Lanesboro, Minn. In the spring of 1884 migration began about the same time as the real migration of the Purple Grackle, that is, in the second week in March. Passing irregularly north, crows reached the stations around latitude 45° in Minnesota March 13 and 14; Frazee City, Minn. (latitude 46° 33′), March 17, and finally arrived at Oak Point, Manitoba, on the last of the month. They were marked as coming to Portage La Prairie, Manitoba, April 4, which date is said to be later than usual.

During the winter of 1884-'85 (on New Year's day) crows were again seen at Lanesboro, Minn., and either winter residents or very early migrants were seen at New Cassel, Wis., January 27. From the records for the spring of 1885 it is easy to trace two routes and times of migration. The first was along the Mississippi River. The enormous numbers which roosted at Saint Louis, Mo., March 2, began to decrease rapidly after March 4. At Excelsior, Minn., they arrived March 1; at Minneapolis, Minn., March 7 and March 9 (two observers); at Elk River, Minn., March 14; Saint Cloud, Minn., March 11, and White Earth, Minn., March 20. The second line of migration was over the prairie along the valleys of the Missouri River and the Red River of the North. The first came to Emmetsburgh, Iowa, March 26; Grand View, Dak., March 30; Rochester, Minn., March 31; Argusville, Dak., March 31; Menoken, Dak., March 31; and probably also on the same day to Moorhead, Minn. (latitude 46° 56′); for although I saw none there until the next day, yet their abundance then (about two hundred being seen) would indicate that some of them had come the day before (March 31). On this same migrating route they reached Two Rivers, Manitoba, April 2, and Shell River, Manitoba, April 3. They were reported from Oak Point, Manitoba, March 28, and Ossowo, Manitoba, March 29; which fact seems to indicate that the crows which appeared at these two places had come by way of the Mississippi River. Continuing the comparison between Oak Point and Shell River, we find that although Shell River is half a degree farther south the average date of arrival was later than at Oak Point. Out of fourteen of the more common birds which were reported by both stations, two arrived at both places the same day, three came to Shell River an average of three days earlier than to Oak Point, and nine came to Oak Point an average of five days earlier than to Shell River.

In the fall of 1885 the Crows began to go to roost in numbers at Saint Louis, Mo., September 24; the bulk arrived October 27, and very many were present November 1.

Mr. Lloyd states that in the eastern part of Concho County, Tex., Crows breed in colonies early in May.

490. Corvus ossifragus Wils. [283.] *Fish Crow.*

The home of the Fish Crow is in the South Atlantic and Gulf States, where it is resident, especially along the coast. It is common in southern Louisiana.

491. Picicorvus columbianus (Wils.). [284.] *Clarke's Nutcracker.*

Dr. Agersborg furnished the only record from the observers for this Rocky Mountain bird, he having taken it as an accidental visitant at Vermillion, Dak., in October, 1883. Professor Aughey saw it once in Nebraska.

492. Cyanocephalus cyanocephalus (Wied). [285.] *Maximilian's Nutcracker; Piñon Jay.*

A rare visitant from the Rocky Mountain region. October 23, 1875, three specimens were killed near Lawrence, Kans. (Snow).

494. Dolichonyx oryzivorus (Linn.). [257.] *Bobolink.*

A common migrant in the Mississippi Valley, breeding from Kansas and Illinois northward. In 1884 fifty-four notes were furnished on this species. Studied with relation to the warm and cold atmospheric waves, in the same way that was done in the case of the Kingbird (see pages 142–147), it is found that just 50 per cent. of the records are bad—that is, they agree with the cold wave instead of the warm; 11 per cent. are indeterminate, and only 39 per cent. agree with the maximum of the warm wave. Why it should be thus is not known, though the fact that the bird frequents marshy meadows, and hence is less easily noted, may partially account for the difference.

Wintering south of the United States, the earliest record of its appearance was from Saint Louis, where it arrived April 29. The notes from Illinois are of no value. Bobolinks were noted at latitude 43° 06′ in Wisconsin, May 1; the bulk reached latitude 43° 20′ in Wisconsin with the next wave, May 5; while with the following wave, May 11, the first reached latitude 44° 26′, the bulk following on the 18th. West of the Mississippi the movements agree a little better with atmospheric waves. After reaching Saint Louis, April 29, the next wave brought them at latitude 40° 50′ in Iowa, May 3, and latitude 42° 01′ and latitude 42° 18′ in Iowa, May 5, while arrivals at latitude 43° 48′ and 45° 25′ in Minnesota were noted the day after the maximum wave, on May 10. The movements of the bulk averaged about ten days in the rear of those of the van.

On the prairie the maximum wave of the night of May 9 brought them to latitude 40° 53′ in Nebraska and latitude 41° 21′ in Dakota. They reached latitude 46° 58′ in Dakota May 17, and May 23 were noted from latitude 50° 30′ in Manitoba.

In the fall of 1884 the first Bobolink at San Angelo, Tex., was seen October 2, and at Abbeville, La., one was reported August 4.

In the spring of 1885 the earliest record came from Mount Carmel, Mo., April 20, but it was not again seen there until May 1. In the meantime it had been seen at Saint Louis, Mo., April 28. A few stations in northern Illinois reported Bobolinks May 5 and 6, but the pronounced movement did not take place until May 10 to 12, during which three days the species spread from southern Iowa to latitude 45° in Wisconsin and Minnesota, and to Huron, Dak., latitude 44° 21′. They reached Argusville, Dak., May 14; Menoken, Dak., May 15, and Shell River, Manitoba, May 18. In the fall of 1885 the last Bobolink was reported from Elk River, Minn., September 3; Fernwood, Ill., September 20 and Grinnell, Iowa, July 27.

494 a. Dolichonyx oryzivorus albinucha Ridgw. [——] *Western Bobolink.*

The western race of the Bobolink is found from Dakota to Utah and Nevada, and north into western Manitoba, where it was reported as an abundant summer resident.

495. Molothrus ater (Bodd.). [258.] *Cowbird.*

A common breeder throughout the Mississippi Valley and Manitoba. In winter flocks abound in the Southern States, extending north to southern Illinois in the east, and in the west to the central part of Indian Territory. At San Angelo, Tex., it was reported as resident, a few remaining in winter, but most of them going south. On asking Mr. Lloyd whether he was sure it was *M. ater* that nested there, he replied that its identification as the typical bird was positive, and that he had found their eggs from May 1 to June 10 in nests of the Orchard Oriole, Nonpareil, Bell's Vireo, etc.* In this he agrees with Mr. Nehrling, who makes the same statement concerning its breeding at Houston, Tex. In Indian Territory, at Caddo, they were quite common throughout the winter of 1883-'84, but all the birds were either females or males in the garb of the female; no bright males were seen until January 17, and no flocks of males until January 19. The bulk of males came January 22; the bulk of the species left February 22, and the last disappeared March 24. At Saint Louis, in the spring of 1884, the first came March 17, but only a few were seen. At Carlinville, Ill., some were seen March 31, and at Burlington, Iowa, April 7. So far the dates probably represent somewhat nearly the actual movements of the species. Then came the severe and widespread snow-storms of the early part of April, as a result of which only one record north of Burlington was made previous to April 16, but when the records began again they were so thoroughly and hopelessly contradictory that it is useless to attempt to reconcile them. All that can be said is that "firsts" came to stations between the parallels of 41° and 45° all the way from April 16 to May 15, being quoted from latitude 45°, April 16, and from latitude 41°, May 15, with all intermediate dates between. The first was recorded from Argusville, Dak., May 9. There seems to be an error in the date (April 14) given from Oak Point, Manitoba. The female of the Red-winged Blackbird was marked as coming the same day, and possibly was mistaken for it.

In the fall of 1884 the last migrant was seen at Mount Carmel, Mo., September 20.

In the spring of 1885 the records from stations east of the Mississippi River were too irregular for use. From those farther west the following may be selected as giving an approximate idea of the time of migration. The first were noted at San Angelo, Tex., March 6; hundreds were seen at Bonham, Tex., March 23; the first was reported from Saint Louis, Mo., March 30; Des Moines, Iowa, April 10; Waukon, Iowa, April 21; Lanesboro, Minn., April 23; Heron Lake, Minn., April 28; Argusville, Dak., May 4; Shell River, Manitoba, May 14. In the fall of 1885 the last Cowbird at Grinnell, Iowa, was seen November 1; at Saint Louis, Mo., the last flock was seen October 30; at Bonham, Tex., the first migrants appeared October 14.

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* In a recent paper on the birds of western Texas Mr. Lloyd gives this species as a spring and fall migrant, and the Dwarf Cowbird as the form which breeds there. (The Auk, Vol, IV, 1887, p. 290.)—C. H. M,

495a. Molothrus ater obscurus (Gmel.). [258 a.] *Dwarf Cowbird.*

This is the common Cowbird from middle Texas southward and westward. It was noted at San Antonio by Mr. Atwater, breeding there in company with the typical form. Mr. Lloyd states that it is abundant in summer in Tom Green and Concho Counties, Tex., and Mr. Nehrling records it as a common breeder in eastern Texas, near Houston.

496. Molothrus æneus (Wagl.). [259.] *Bronzed Cowbird.*

A Mexican and Central American species, whose northern limit is in the valley of the Lower Rio Grande, in Texas. It was found breeding abundantly at Fort Brown, Brownsville, Hidalgo, and Lometa Ranch, by Dr. J. C. Merrill and Mr. Geo. B. Sennett. One of our observers, Mr. Negley, says it is abundant at Eagle Pass.

497. Xanthocephalus xanthocephalus (Bonap.). [260.] *Yellow-headed Blackbird.*

Breeds from Manitoba southward. Though a bird principally of the Plains and of western North America, it may be found in restricted localities over most of the Mississippi Valley. It seldom winters as far north as Illinois, but is found in the Southern States. In eastern Texas near Houston, it is a common winter resident (Nehrling). In the valley of the Lower Rio Grande it occurs in winter, but is not common (Sennett & Merrill). It is very abundant in winter at Mermenton, La., and was reported as a spring visitor at Corinth, in northeastern Mississippi. Most of the migration takes place in April. In the spring of 1884 the Yellow-headed Blackbird reached Oak Point, Manitoba, May 5, and the bulk appeared the next day at Portage la Prairie, Manitoba. Many records were received, but they are very irregular. For example, in Minnesota the first was seen at latitude 45° 05′, June 3; at latitude 47° 25′, May 17, and at latitude 46° 33′, April 8, when it was "common." It is probable that the irregularity in the notes on this species is due to the restricted localities which the birds visit year after year, their passage to and fro being unnoticed. Should the observer know these spots and watch them closely he will find the real first, but if he trusts to chance to show him the bird his record will be much behind. While living in Wisconsin there was a spot covering a few acres, 19 miles distant, where the birds could be found every year; but in over a dozen years' residence none were ever seen in the marshes within 5 miles of town, though during this time they had slightly extended their range.

In the fall of 1884 flocks of Yellow-headed Blackbirds were seen at San Angelo, Tex., September 28, and two days later the last had gone.

In the spring of 1885 the record of no other species showed so plainly that its migration on the Plains was much later than in corresponding latitudes nearer the Mississippi River. The Texas records were quite regular and are as follows: At Eagle Pass, Tex., the first was seen April 12; San Antonio, Tex., flocks were seen passing north almost every day from April 13 to May 25, on which date a flock of several thousand was seen in a field where oats were being cut. At both Bonham, Tex., and Gainesville, Tex., the first were seen April 22. The Kansas records also were regular, so far as that single State is concerned. They were: Emporia, Kans., April 11; Richmond, Kans., April 15, and Manhattan, Kans., April 18. The eastern records were much earlier. The first came to Paris, Ill., April 2; to Heron Lake, Minn., April 12 (common there April 16); to Huron, Dak., April 14; to Argusville and Menoken, Dak., April 20 and 21; and to Two Rivers and Shell River, Manitoba, May 1.

498. Agelaius phœniceus (Linn.). [261.] *Red-winged Blackbird.*

An abundant summer resident in Manitoba and the Mississippi Valley. It breeds abundantly in eastern Texas and in the valley of the Lower Rio Grande. In 1884 sixty-eight observers reported on the movements of this well known bird. But, as in the case of most other species, the number of records from the southern part of the district were few. Enough, however, were received to confirm the belief that these Blackbirds gather in flocks in winter; that they have regular roosts, sometimes in company with Grackles or even Crows; that the females do not always retire so far to the south as the males, or so early in the winter; and that the males precede the females in spring migration.

At Yazoo City, Miss. (latitude 32° 50′), they were seen "dusting" themselves with snow in January. At Abbeville, La. (latitude 29° 57′), they are common winter residents. At Caddo, Ind. Ter., they were common during the entire winter of 1883–'84. At Saint Louis, Mo., a flock of females was seen December 29 and again during January. At Manhattan, Kans., a few females were seen during January and February, always in warm, cloudy weather. They seem to winter in flocks as far north as Kansas, Missouri, and southern Illinois—say up to latitude 40°. Their accidental occurrence in winter has been noted at various more northern points. At Alda, Nebr. (latitude 40° 53′), three or four were seen every few days during the entire winter coming to the cattle yards to feed. At Lake Mills, Wis. (latitude 43° 06′), an accidental visitor arrived February 19 and was fed with corn by a farmer for several weeks.

The first northward movement recorded in the spring of 1884 came from Pierce City, Mo. (latitude 36° 56′), where large flocks passed north January 29 and 30. At Saint Louis, January 31, a flock of twenty went north in advance of the Robins. On January 22 they began to increase in numbers at Caddo, Ind. Ter. The first wave of migration reached Odin and Carlinville, Ill., February 12, when large flocks arrived. February 16 additional flocks of migrants arrived at Caddo, Ind. Ter.

No further progress was recorded until March 11, when large flocks appeared in the lowlands near Saint Louis. On the following day migrants appeared at Osceola and Polo, Ill. March 15 the first arrived at Ferry, Iowa; Manhattan, Kans. (a flock of young males), and Unadilla, Nebr. From this date to the close of the month was but a succession of records of appearance, either of first or of bulk, at the various stations throughout Missouri, Illinois, Iowa, Wisconsin, and Minnesota.

At Green Bay, Wis., the first arrived April 6. On the same day the first was seen at Pine Bend, Minn. Two days later (April 8) the first was seen at Frazee City, Minn. Farther west the progress seems to have been less rapid and more irregular. March 20 the first arrived at Linwood, Nebr., and Vermillion, Dak. (the last were all males); March 30 at Barton, Dak.; April 3 at Two Rivers, Manitoba. April 12 the bulk arrived at Manhattan, Kans. April 14 the first arrived at Oak Point, Manitoba, the most northern point of observation. Ten days later, April 24, the first was noted at Ellis, Kans., and at Menoken, Dak., two points almost 600 miles apart. The limited extent of marshy country in Kansas will probably account for their late arrival at Ellis.

In the fall of 1884 the bulk of the Red-shouldered Blackbirds left Elk River, Minn., November 1, and Des Moines, Iowa, November 8 (nor were any seen there after this date). At Mount Carmel, Mo., large numbers passed August 15, and the last was noted November 6. Even in southern Louisiana many passed southward as early as August 4.

During the winter of 1884-'85 a few irregular notes were contributed. A Red-shouldered Blackbird was taken in January at Paris, Ill., and a few were seen at odd times during February at Mount Carmel, Mo., and Odin, Ill. In the spring of 1885 the first regular northward movement recorded occurred on the last day of February, when a flock of a hundred passed over Corinth, Miss. The next day they were seen at Pierce City, Mo., and March 2 at Saint Louis. From March 4 to March 8 a few scattered flocks visited various parts of northwestern Illinois near the Mississippi River. They were seen at Aledo, Hennepin, and Tampico. From March 11 to March 14 the same thing took place along the valley of the Des Moines River, where flocks were seen at Knoxville, Des Moines, Newton, and Grinnell, Iowa. The first full wave which passed over this country (that is to latitude 42° in Illinois and Iowa) was reported March 25 and March 26 from Mount Pleasant, Iowa, La Porte City, Iowa, Fernwood, Ill., and Batavia, Ill., with stragglers at Delavan, Wis., and Heron Lake, Minn. The largest wave of the season in the migration of this species occurred during the last day of March and the first day of April. This wave brought "firsts" to Sioux City, Iowa, Emmetsburgh, Iowa, Williamstown, Iowa, Rockford, Ill., Clinton, Wis., Milwaukee, Wis., Lake Mills, Wis., Leeds Centre, Wis., and Ripon, Wis., and to Lanesboro, Minn., with a scout at Luck, Wis. During the next three days the first were noted at Durand, Wis., and Lake City, Minneapolis, Fridley, and Elk River, Minn. None were noted by the observers at Green Bay, Wis., until April 17. They reached White Earth, Minn., April 6. On the Plains the movement was as follows: Emporia, Kans., was reached March 12, and Manhattan, Kans., March 29. At Unadilla, Nebr., an irregular and very large flight occurred March 11, but no more were seen until the regular advance of April 1. They were reported from Linwood, Nebr., March 31; Grand View, Dak , April 10; Huron, Dak., April 12; Two Rivers, Manitoba, April 16; and Oak Point, Manitoba, April 18.

In the fall of 1885 the last was reported from Green Bay, Wis., September 23; Iowa City, Iowa, October 15; Fayette, Mo., October 20; and Mount Carmel, Mo., November 15. Stragglers were seen at Grinnell, Iowa, as late as November 21, and at Lanesboro, Minn., November 4. At Saint Louis, Mo., several large flocks were seen October 5; the height of migration was reached October 11, and many flocks went south November 8 and 12.

The breeding habits of the Red-wings are well known. They remain to nest in favorable localities throughout Missouri and eastern Kansas. Probably not a few breed in Indian Territory. At Saint Louis males and females were together at breeding stands April 30 (1884), and the last flock of females passed northward May 11.

501. Sturnella magna (Linn.). [263.] *Meadowlark.*

The eastern Meadow lark is a common and well known bird from the Mississippi eastward; west of the Mississippi it is found with the western Meadow-lark (*S. neglecta*) as far as the edge of the Plains, beyond which it is almost entirely replaced by that species. In southeastern Dakota Dr. Agersborg says the eastern form does not occur; in Kansas it is common in the vicinity of Lawrence and Topeka; but at Manhattan, 50 miles farther west, it is almost replaced by *S. neglecta.*

The winter quarters of the eastern Meadowlark do not seem to be well defined. Apparently it is abundant in the lower valley of the Mississippi, wherever there are suitable meadows sheltered from the extreme cold; but it seldom winters here so far north as it does in the Atlantic region. In going westward from the shelter of timber-belts it seems to retire farther southward. Thus, in Illinois it is common in sheltered localities as far north as latitude 40°, while farther west, on the Plains, except in favorable seasons, it retires farther southward, being rare north of latitude 38° in Kansas and Missouri. It is common in winter near Fort Brown, in the valley of the Lower Rio Grande (Merrill). In 1884 sixty-two observers in the Mississippi Valley sent notes concerning this bird. At Eagle Pass, Tex., on the Rio Grande, it was reported as plentiful all winter. At San Angelo, Tex., it was reported as resident and abundant in winter. The Nueces Cañon is the winter home of countless myriads. At Mermenton, La., near the Gulf coast, they are resident and much more abundant in winter than in summer. At Caddo, Ind. Ter., they are resident, but not so common as *S. neglecta.* At Darlington, Ind. Ter., some remained throughout the winter of 1883–'84. At Linwood, Nebr., one was seen February 16. It may have remained there all winter or have been an adventurous scout of the army that moved from winter quarters in Texas about this time. At Odin, Ill., they were common February 2, in small flocks. At Danville, Ill., they were reported as resident.

Early in February, 1884, winter quarters were moved from southern Louisiana and Texas northward, but, except in the case of a few individuals, none reached points beyond the usual bounds of their winter home. By February 26 few were left on the southern border.

About March 8 the first general wave of migration set in. The first records, too, unlike those of most birds, came from the prairie region. On March 8 they arrived at Caddo, Ind. Ter.; March 9 at Unadilla, Nebr.; and March 10 at Des Moines, Iowa. These were the advance-guard. The great army followed close in the rear, reaching Darlington, Ind. Ter., March 10, and Linwood, Nebr., about the same time.

At Saint Louis the first silent arrival on the lowlands was noted March 11. The bulk followed March 17 in flocks of twenty to twenty-five, noisy. By this date the advance had spread throughout Illinois and the greater part of Iowa. From March 8 to the close of the month there was but one day on which the first appearance of the Meadowlark was not reported at some station. There seems to have been no general interruption in the northward movement. On March 28 the first arrival was noted at Green Bay, Wis., Lanesboro, Minn., and Red Wing, Minn. On the same day the bulk reached Barton, Dak., and was reported at Fridley, Minn. March 27 the first reached Larimore, Dak., and Elk River, Minn.

As the eastern Meadowlark is known to breed abundantly north of the United States, it is probable that many of those which arrive at the different stations in Minnesota and Dakota are but transient visitors. Little has been noted on this point, or as to the time of nesting at the different stations. At Saint Louis they were noisy and excited April 14. At Manhattan, Kans., nesting began early in May. The only record from Manitoba came from Two Rivers, where the first was noted April 18. From the date at hand it seems that during migration this species lingers longest in the northern part of the United States. It seems to move quite rapidly over the greater part of the way, and to take the last portion leisurely.

In the fall of 1884 the bulk left Elk River, Minn., September 29, and the last was seen there October 15. At Des Moines, Iowa, the bulk left October 20, and the last was seen November 9; at Shawneetown, Ill., they were seen in numbers all winter. The first came to San Angelo, Tex., October 5, and to Mason, Tex., October 11.

The notes on the migration of the eastern Meadowlark in the spring of 1885 indicate that the species does not migrate by rushes, but travels a few miles almost every night from the time of starting until the journey's end is reached. This starting took place March 3 at Saint Louis, Mo., and Paris, Ill. March 10 brought them to Mount Carmel, Mo., Fayetteville, Mo., and Glasgow, Mo., while a couple of scouts had previously visited Grinnell and Newton, Iowa. March 13 and March 14 a regular advance was made to Ferry, Iowa; Richmond, Iowa; Tampico, Ill. (both observers), and Hennepin, Ill. Nearer the Mississippi River they were noted March 15 and March 16 at Mount Pleasant and Morning Sun, Iowa, and Aledo and Peoria, Ill., though it is probable that at all four of these places the birds actually came March 14. March 25 and March 26 they were found moving in the vicinity of Lake Michigan, at Batavia, Ill.; Delavan, Wis., and Stoughton, Wis. March 27 they reached Milwaukee, Wis., and Williamstown, Iowa. The last days of March and the first day of April were days of enormous migration in the Upper Mississippi Valley, bringing Meadow-larks to Waukon, Iowa; Lanesboro, Minn.; Lake City, Minn.; Leeds Centre, Wis.; Ripon, Wis.; and New Cassel, Wis. April 5 they were noted from Durand, Wis.; River Falls, Wis., and Green Bay, Wis.; and April 6 a half dozen were seen at White Earth, Minn. In the fall of 1885 the last left River Falls, Wis., September 26; Grinnell and Iowa City, Iowa, October 11; Des Moines, Iowa, October 18; Fernwood, Ill., October 25; and Mount Carmel, Mo., November 13. The first migrant reached Bonham, Tex., October 14; the next October 16; and the species was common there October 20.

501 a. Sturnella magna mexicana (Scl.). [263 *a.*] *Mexican Meadowlark.*

From Mexico this form reaches only a little way into our district, keeping near the Rio Grande River, where it is common in summer. It was recorded by Mr. Negley as common at Eagle Pass, Tex.

501 b. Sturnella magna neglecta (Aud.). [264 *b.*] *Western Meadowlark.*

Chiefly a bird of the Plains. Breeds from western Manitoba southward. It breeds commonly in western Minnesota (Roberts & Benner, Bull. Nutt. Ornith. Club, Vol. V, 1880, p. 15). It is a common resident in western and middle Kansas (Goss). On the western line of migration, in the Mississippi Valley, the eastern Meadow-lark is replaced by this form, which is well marked both in plumage and song. In the eastern parts of Texas, Indian Territory, Kansas, Nebraska, and Dakota the eastern form predominates, but on the Plains farther west it disappears and is replaced by *S. neglecta*, which is found as far eastward as northeastern Iowa and northern Illinois.

At San Angelo, Tex., it was reported as resident. Probably the greater number pass northward to breed, since at Mason, Tex., the bulk was reported as departing March 31, 1884, though a few remained as late as April 17. At Caddo, Ind. Ter., it was reported as resident, outnumbering the eastern form. In fall migration it was abundant, in flocks of 200 to 500; but only a few were seen in the coldest weather. The first of the transients returned February 16. At Ellis, Kans., the first arrived March 10; and at Manhattan, Kans., a pair remained all winter on the farm of the State Agricultural College. The first migrants came March 1; the bulk came March 13. On March 18 large flocks were seen in full song. Some of the eastern form accompanied them, but they were not numerous. Both *magna* and *neglecta* breed here, but *neglecta* is much more abundant. Nests were seen as early as May 9. Two broods are raised in a season. At Vermillion, Dak., the first was seen March 20; at Argusville, Dak., March 27; at Oak Point, Manitoba, May 17.

Dr. Agersborg states that the western Meadowlark breeds abundantly in southeastern Dakota, to the exclusion of the eastern.

In the spring of 1885 no distinction was made in the records of observers between the eastern and western Meadowlarks, and it was thought that they could not be separated until a decided difference was discovered in the times of their migration. The general rule holds good for fully nine-tenths of the migratory birds of the district, that those which pass over the Plains migrate several days or even weeks later than their fellows which are traveling nearer the Mississippi River. Hence, when we find that the Meadowlarks of the Plains move quite uniformly a week or more *in advance* of their eastern brethren, it may be safely concluded that the difference in time is caused by a difference in the species. These western birds were quite plentiful at Ellsworth, Kans., during the month of February, and on the 4th of March appeared at Unadilla and Linwood, Nebr., being common at Linwood by March 12. They reached Grand View, Dak., March 21; Sioux City, Iowa, March 22; Huron, Dak., and Emmetsburgh, Iowa, March 25; Heron Lake, Minn., March 26; Moorhead, Minn., March 31, where they were heard and seen over a sheet of snow which had fallen the day before. At Menoken, Dak., the first was seen April 4; at Larimore, Dak., April 5; at Ossowo, Manitoba, April 6; and at Oak Point, Manitoba, April 9.

503. **Icterus audubonii** Giraud. [266.] *Audubon's Oriole.*

The home of Audubon's Oriole is from central Mexico north to the Lower Rio Grande Valley, in Texas, where it is a tolerably common resident. It is the only Oriole which spends the winter within the United States.

505. **Icterus cucullatus** Swains. [269.] *Hooded Oriole.*

The Hooded Oriole inhabits eastern Mexico, coming north to the Lower Rio Grande, in Texas, where it is a common summer resident, and the most abundant of the four Orioles that breed there.

506. **Icterus spurius** (Linn.). [270.] *Orchard Oriole.*

The Orchard Oriole is a common summer resident in most parts of the Mississippi Valley, breeding from southern Texas to central Minnesota and Dakota. It is a common breeder at Brown's Valley, on the boundary between Dakota and Minnesota (Roberts & Benner, Bull. Nutt. Ornith. Club, Vol. V, 1880, p. 15); and Mr. J. A. Allen found a few as far west as Heart River, Dak., west of the Missouri (Proc. Bost. Soc. Nat. Hist., Vol. XVII, Oct., 1874). It winters south of the United States, and crosses our border about the last of March. Its migration is steady and uniform. Its advance northward occurs at the same time on both sides of the Mississippi, and even on the Plains. Moreover, it is so conspicuous a bird that it is easily observed. In the spring of 1884 the first male arrived at San Angelo, Tex., April 13, and the first female three days later. At Gainesville, Tex., the first came April 14; at Abbeville, La., April 16. East of the Mississippi they appeared earlier, the first male being seen at Rodney, Miss., March 31, and the first female April 9. April 27 they reached Griggsville and Danville, Ill., and the next day three old males were seen at Saint Louis. April 29 they were seen at Fayette, Mo.; April 30, at Manhattan, Kans., and by May 10 they had advanced to latitude 41° 58′ in Illinois, latitude 41° 40′ in Iowa, and latitude 40° 53′ in Nebraska, though the probability seems to be that the advance was made simultaneously to all places on the 7th. May 12 they came to Laporte City and Waukon, Iowa, with one a little behindhand at Milwaukee, Wis., May 17. At Lanesboro, Minn., they were seen May 23, three days after they had reached Elk River, Minn. Elk River is near the northern limit of their range. They breed commonly in southeastern Dakota. A few have been seen in central Dakota, and they have been recorded from White Earth, Minn. (latitude 47°). North of this there appears to be no record. The bulk moves closely behind the first, two or three days only in the rear. The full record from Saint Louis is as follows:

> The first came April 28, when three old males were in song at their breeding places; April 29 the bulk of old males arrived; April 30 the first two-years-old male; May 5 the first female and an increase of young males; May 6, conspicuous and noisy. The height of the season was attained May 5 and 6. May 8, several old males were mated. May 9, first one-year-old male arrived; bulk of females arrived; some beginning to build. May 17, males and females always together. May 31, incubated eggs were found.

In the fall of 1884 the last old male Orchard Oriole left San Angelo, Tex., August 31; the last young male, September 10; the last female, September 6.

The record of this species was so regular during the spring migration of 1884 that its movements in 1885 were watched with much interest. About a dozen irregular notes were contributed in 1885, but taken as a whole its record still stands as that of a species of unusual uniformity in its migrations. It was first seen, just after its arrival in the United States, at Houma, La., March 28. At San Angelo, Tex., in the same latitude as Houma, but farther west, none were seen until April 7, though they were seen April 10 at Bonham, Tex., and April 11 at Gainesville, Tex., which latter note agrees very well with the record from Houma. The probable explanation of the lateness of the record at San Angelo is found in the altitude of the place, which is nearly two thousand feet. Saint Louis, Mo., was reached April 21; and, although the bulk of males was noted there the next day, there was no record from any neighboring station until April 27, when they were reported from Odin, Ill. April 28 they were seen at Paris, Ill., and Fayette, Mo.; and April 30, at Emporia and Manhattan, Kans. The next advance was recorded May 5, when they reached Morning Sun, Iowa, Des Moines, Iowa, Peoria, Ill., and Hennepin, Ill. May 7 one was seen at Sioux City, Iowa. May 15 and May 16 a large wave extended from latitude 42° to latitude 45°, and carried them to their journey's end. The most northern stations from which records were received are: New Richmond, Wis., Elk River, Minn., and Huron, Dak., though at this last place they were not noted until May 20. The full record from Saint Louis, Mo., was: "April 21, first; April 22, first female and bulk of males; April 28, first male of third year; May 5, first male of second year; May 13, full numbers. The bulk of females arrived the first week in May."

In the fall of 1885 the last migrant left Grinnell, Iowa, September 10. The summer residents left Mount Carmel, Mo., June 7. The last migrant left Bonham, Tex., September 15.

507. Icterus galbula (Linn.). [271.] *Baltimore Oriole.*

The Baltimore Oriole is a common summer resident throughout most parts of the Mississippi Valley proper, breeding from the Gulf States to Manitoba. In the spring of 1884 the first record of its migration was made April 7, when it appeared at Rodney, Miss., and the last May 25, when it reached Oak Point, Manitoba. These dates indicate an average speed of 27 miles a day. In 1883 it was found that the rate of its migration was very uniform. Hence it will be interesting to trace the record for 1884 and see how the two agree. Saint Louis, Mo , was reached April 26, which indicates a rate of 25 miles a day; but in going directly north we find a record on the 25th at Hillsborough, Ill., which would make a speed of just 27 miles a day. About April 29 and April 30 there seems to have been much movement—not so much the advance of the van as the filling up the country already traversed, bringing the bulk to the region from latitude 39° 30′ southward, and the van to latitude 41°, and in the west to Manhattan, Kans. (latitude 39° 12′). Continuing the journey at the rate of 27 miles a day, the species should have advanced by May 6 to about latitude 43° 30′; and the records received demonstrate the correctness of this computation. May 5 and May 6 were days of special movement in Iowa, Minnesota, Illinois, and Wisconsin. During these days there were records over all of northern Illinois and southern Wisconsin to latitude 43° 06′, with a stray one at latitude 44° 22′; and Minnesota shows good records at latitude 43° 43′, with an extra advance along the Mississippi River to latitude 44° 32′. May 12 should have found it at latitude 46°, and records were received of its appearance that day at 45° 25′ and 46° 33′ in Minnesota. Hence it appears, omitting a few minor local variations which were to be expected, that the species shows a remarkable uniformity in its rate of migration throughout this long distance. There was, however, no trace of the increase of speed from the south northward which was noticed in 1883, the highest rate being in the middle districts during the first week in May In the prairie region the records were somewhat later, the birds reaching latitude 39° 12′ in Kansas, April 30; 40° 53′ in Nebraska, May 9, and 44° 21′ in Dakota, May 22. Farther west, almost at the extreme limit of its western dispersion, it was observed at Gainesville, Tex., and Ellis, Kans. The full record from Saint Louis is as follows:

> April 26, first (three males at stands calling); April 28, bulk of males arrived (in all the notes the bulk of the species averaged about four days behind the first); May 3, first females (the average for females was seven days behind the first, and as the arrivals of the bulk may be separated into two series, one about two or three days in the rear of the firsts, and the other of seven or eight, it is evident that the first series indicates the arrival of the bulk of the males, while the second indicates the increase of the species as a whole, caused by the arrival of the females); May 5, bulk of females and many transients arrived, making this day the height of the season. (As has already been stated, this day and the next were the days of special movement of this species, and this seems to have been true over an immense area of country, stretching from latitude 34° to latitude 44°.) May 10, the first one-year-old male arrived; May 11, species very much excited, and transient birds of last year present; May 31, set found of six incubated eggs.

In the fall of 1884 the bulk and the last individual left Williamstown, Iowa, August 8. The bulk left Des Moines, Iowa, August 26; the last was seen there August 30. At Mount Carmel, Mo., none were seen after the middle of the month, and at Gainesville, Tex., they were seen August 20.

In the spring of 1885 the migration of the Baltimore Oriole in the Mississippi Valley, so far as our stations are concerned, began April 15, when the species was seen at Corinth, Miss. April 20 it reached Shawneetown, Ill., and Saint Louis, Mo. Two days later it appeared at Paris, Ill., one degree farther north. April 25 and April 26 it was reported from Aledo, Ill., and Mount Pleasant and Keokuk, Iowa. April 29 and April 30 the movement extended northeastward up the Rock River Valley to Batavia, Ill., Hennepin, Ill., and Clinton, Wis. On the Iowa River they appeared at Iowa City and Coralville, Iowa, May 1. At Des Moines, Iowa, they were not seen until May 3. May 5 a large wave brought them to Williamstown, Iowa, and carried them up the Mississippi River to Lake City, Minn., and to Ripon and Leeds Centre, Wis. No further advance was made until after the cold snap; then on the 13th and 14th of May they appeared at Green Bay and River Falls, Wis., and Elk River, Minn. Either they traveled earlier on the Plains (where they were noted from Manhattan, Kans., April 21, and Linwood, Nebr., April 24), or else they moved very fast in the latter part of their course, for they were reported from Ossowo, Manitoba, May 15; Shell River, Manitoba, May 16, and Oak Point, Manitoba, May 19. In the fall of 1885 the last migrants were reported from Heron Lake, Minn., September 9; Grinnell, Iowa, September 16; Fayette, Mo., September 1; and from Bonham, Tex., September 5.

508. Icterus bullocki (Swains.). [272.] *Bullock's Oriole.*

This is a bird of the far west, coming east to the western edge of our district. In Dakota it seems to be tolerably common from the

Missouri westward. Dr. Agersborg recorded it as a common summer resident at Vermillion, in southeastern Dakota. It is common in western Kansas, passing eastward even to Manhattan, where, in 1883, the first was seen May 5. In middle Texas it ranges east a little beyond the center of the State. Mr. Lloyd states that it is a tolerably common summer resident in Concho and Tom Green Counties, Tex., "especially on the main streams." He says: "The ordinary date of arrival is April 15 to 20, the birds becoming common about April 24. The females are very retiring. The males are seen with the family as late as September 30. Breeds on the top branches of the mesquite." In southern Texas it ranges farther east. It is an abundant summer resident at Laredo (Butcher). In the valley of the Lower Rio Grande it is a common summer resident (Merrill). In the spring of 1884 it was seen at Mason, Tex., April 7, and San Angelo April 29, when the first male was noted; the first female came May 1, and by May 3 the species was common. This Oriole has been found at Gainesville, Tex., where, in 1876, the first appeared April 29. It winters in Mexico and breeds throughout all its United States range north to British America. At San Angelo it was found breeding from May 15 to June 1, with six eggs in a clutch.

In the fall of 1884 the last Bullock's Oriole was seen at San Angelo, Tex., August 31. The preceding year it had been noted much later, the last female being seen September 14 and the last male October 14.

In the spring of 1885 the first was seen at San Antonio, Tex., April 11, and at Mason, Tex., April 9. They were common at Mason April 16.

509. Scolecophagus carolinus (Müll.). [273.] *Rusty Blackbird.*

A common migrant through the Mississippi Valley as far west as the Plains, where it is principally replaced by Brewer's Blackbird; breeds from Manitoba northward; dispersed in winter over the Southern States from southern Illinois and Kansas southward. In the winter of 1882–'83 its range extended north to Saint Louis. Dr. Coues, in his "Birds of the Northwest," gives some interesting facts concerning the migrations of these two species. He says: "During the breeding season their *habitats* are entirely separate, but they overlap during the fall migration, if not also in winter. In the east, the Rusty Grackle breeds from northern New England (and perhaps farther south in mountains) northward, throughout a great part of the British possessions, from Labrador entirely across to Alaska. Now to take an intermediate point, say Fort Pembina, on the Red River, the extreme northeast corner of Dakota. Here, in the spring and summer, the Rusty Grackle is not known, while Brewer's Blackbird occurs in great abundance, breeding. In the fall, however, the Rusty Grackle enters Dakota from the north on its migration and mixes with the other species" (pp. 198–199). Now if, as Dr. Coues states, the Rusty Crackle does not occur in northeastern Dakota in spring, it would be interesting to know by what course the representatives of this species—which according to Prof.

Aughey, traverse Nebraska in large numbers every spring—get around Dakota on their way to Manitoba and Alaska. Colonel Goss records it as a winter bird in eastern Kansas.

The only good record received of the occurrence together of both species in spring is that given by Mr. Nehrling, who noted a few Rusty Grackles in March, 1881, in company with the flocks of Brewer's near Houston, Tex.; but that was before the Brewer's Blackbirds had commenced their migration.

In the spring of 1884 the Rusty Grackle commenced its northward journey about the last of February, appearing at Manhattan, Kans., where it usually winters, February 13, and at Saint Louis February 26. No further advance was made until after the "second winter;" then they moved again, reaching Des Moines, Iowa, March 22; Chicago, March 29; Lanesboro, Minn., March 30; and West Depere, Wis., April 16. Along latitude 39° in Central Missouri and Illinois the time of greatest abundance was March 21. At Saint Louis the bulk left March 25, and the last was seen April 5.

In the fall of 1884 the first Rusty Blackbird was seen at Des Moines, Iowa, October 23; the bulk arrived October 28; and the last left November 8.

In the spring of 1885 regular migration did not commence until March. The species appeared at Reeds, Mo., March 2; Paris, Ill., March 3 (and again March 5); Saint Louis, Mo., March 14, and the same day at Des Moines, Iowa. April 6 they were noted from Lanesboro, Minn.; April 22, from Argusville, Dak.; and April 24, from River Falls, Wis. The last was seen at Saint Louis, Mo., April 14, and at Lanesboro, Minn., April 22.

In the fall of 1885 they were present in large flocks at Iowa City, Iowa, October 24; and the last one was seen at River Falls, Wis., October 23. At Saint Louis, Mo., the first was seen October 9, and large flocks were going south October 27. A single bird was taken at Gainesville, Tex., in January, 1886.

510. **Scolecophagus cyanocephalus** (Wagl.). [274.] *Brewer's Blackbird.*

As mentioned in speaking of the preceding species, Brewer's Blackbird is a western bird, coming east to eastern Kansas and Minnesota and occasionally to Illinois. Its true home is from the eastern edge of the Plains westward. It winters from western Kansas southward, and breeds over most of its range. In western Manitoba it is an abundant summer resident, and a few breed at Vermillion, Dak. At Caddo, Ind. Ter., it was the most abundant Blackbird in the winter of 1883–'84. During the spring and fall there were clouds of them, and many flocks stayed all winter. That they breed there is shown from the fact that a bird was found which was too young to fly. By March 5 their winter numbers had scarcely increased, from which fact it is pretty safe to conclude that few winter directly south of Caddo, the bulk passing to the southwest. March 15 they were most numerous, the bulk having come slowly for a week. They are not so abundant in the spring as in the fall. The bulk depart about March 21. The first arrived at Ellis, Kans., April 5.

In the spring of 1885 the first Brewer's Blackbird was seen at Pierce City, Mo., March 1; at Richmond, Kans., March 4; Laporte City, Iowa, March 26; and at White Earth, Minn., April 6.

Mr. Lloyd states that they are a fall migrant in western Texas, occasionally wintering in Tom Green County, and that they are abundant in winter in the Nueces Cañon. Mr. Nehrling states that they are an abundant winter resident in eastern Texas, and that a few stop to breed in Harris County.

They are an abundant winter resident in the Lower Rio Grande Valley, arriving the first week in October and remaining till April (Merrill).

511. Quiscalus quiscula (Linn.). [278.] *Purple Grackle.*

This, the typical form of the Purple Grackle, is a bird of the Atlantic coast region, from southern New England to Florida. It has been recently recorded as breeding in West Baton Rouge Parish, La , by Dr. F. W. Langdon, who found it common there from the middle of March to the middle of April, 1881. He says of it:

> A common species during our stay; apparently breeding April 1 to 15. A few specimens, evidently residents, shot for purposes of identification, proved to be of the *purpureus* form, thus considerably extending the known area of its distribution. (Journ. of the Cincinnati Soc. of Nat. Hist., Vol. IV, 1881, p. 150.)

511 a. Quiscalus quiscula aglæus. (Baird). [278 *a.*] *Florida Grackle.*

As its name implies, the true home of this Grackle is in Florida. Thence its range extends westward along the Gulf coast to Louisiana, where it was found by Dr. A. K. Fisher in the spring of 1886.

511 b. Quiscalus quiscula æneus (Ridgw.). [278 *b.*] *Bronzed Grackle.*

This Grackle inhabits all of the Mississippi Valley from the Gulf far into British America, and thence eastward to the Alleghanies, breeding throughout its range. It is less common on the Plains. All notes on *Quiscalus* will be treated under this head, whether they have been sent as pertaining to the Purple or Bronzed Grackle, Crow Blackbird, or Boat-tailed Grackle, as it is practically certain that this is the form that has really been seen. There is an interesting and as yet unexplained peculiarity in its *winter habitat.* Near the Mississippi River it is resident as far south as southern Illinois, and it is not uncommon in winter as far north as Minnesota. A fine male was seen at Hastings, Minn., December 29, 1883, where it had successfully withstood a temperature of 30 degrees below zero; and during the whole winter of 1881–'82 small flocks stayed at various points in the State. In Louisiana* it was

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*Since the taking of typical *Quiscalus quiscula* in Louisiana by Dr. Langdon, and the discovery of *Quiscalus quiscula aglæus* near New Orleans by Dr. Fisher, considerable doubt attaches to the Louisiana records of the present subspecies. A profitable field is open to the ambitious student of ornithology who will undertake to ascertain the exact distribution of these three forms in the Gulf States.—C. H. M.

reported to be more abundant in winter than in summer, but there seems to be a gap during the winter between this State and Mexico. It appears to shun the whole State of Texas, passing on to Mexico. Mr. Nehrling did not find it in southeastern Texas, and distinctly says that it "arrives in the spring from its more southern winter home." Mr. N. C. Brown did not find it at Boerne, Tex.; Mr. Lloyd says that only a few stragglers are seen at San Angelo in winter; Mr. Henry records it as a rare winter bird at Mason, and even so far south as Eagle Pass Mr. Negley gives it as arriving in the spring from the south. The case is not without parallel, for much the same thing occurs with the Phœbe (*Sayornis phœbe*) and the Turkey Buzzard (*Cathartes aura*). At Caddo, Ind. Ter., two hundred miles south of its ordinary wintering place on the Mississippi, none were seen after November 12.

In the spring of 1884 the first warm wave brought the Crow Blackbirds back to Saint Louis February 2, and to one or two other places; but winter returned and no real movement took place until after the warm weather came again. At Saint Louis the general thaw began March 10, and March 11 the real migration began. March 12 several flocks arrived at Alton, Ill.; thousands passed over Hillsborough, Ill.; many were seen at Carlinville, Ill., and the first arrived next day at Mount Carmel, Mo., and at Gainesville, Tex. By March 18 the species had advanced to a little beyond latitude 42° in southern Wisconsin and in Iowa, with no irregular notes beyond these points, while in the west they had not been seen north of latitude 35°. During the next week (to March 25) great progress was made, and the van was brought fairly up to latitude 44° 45′ in Wisconsin and Minnesota, but in the west it reached latitude 41° only. In Indian Territory, Kansas, and Nebraska most of the movement took place March 20 and March 21; but in Minnesota and Wisconsin the Purple Grackles helped to swell the ranks of the multitudes of birds that were migrating on March 23 and March 24. This species was reported at Minneapolis and Elk River, Minn., March 28 and March 29, and the bulk about April 1. Thus in the Mississippi River region it had extended well up toward our northern border before the storms of early April set in, and since it reached Oak Point, Manitoba, April 10, it may be supposed that some representatives of the species were north of the storm center, which was in central Dakota, and hence were not delayed in their northward journey. In the west the case was different. A single individual had reached Vermillion, Dak., April 1, but it was far ahead of its fellows, which had been caught and stopped by the snow-storms which continued from about March 20 to April 10. Then they moved again, and from April 16 to April 18 were seen as far north as Argusville, Dak. At Larimore, Dak., out on the prairie, they were not seen until May 4, and far west, at Ellis, Kans., they did not come until April 19.

From the early date of the appearance of this species at Oak Point, Manitoba, and from several other early dates—early as compared with

Dakota dates, but not particularly early when compared with the dates from the region close to the Mississippi—it might be inferred that, in many species at least, the line of migration is from central Minnesota north and a little westward *to* the valley of the Red River, but not *across* it, and that they follow this valley, reaching Manitoba in advance of those that have come by way of the Plains or the valley of the Missouri River.

The bulk of Purple Grackles arrived at about latitude 40° previous to March 19, most of the advance occurring on the 12th and 13th. During the rest of the month, before the advance was stopped by the snow, the species occupied two more degrees of latitude (to 42°), and by the second week in April it had reached latitude 45°. March 22 was a special day for the movement of bulk, which may account for the great number of firsts recorded March 23 and March 24.

In the fall of 1884 the bulk of Bronzed Grackles left Elk River, Minn., November 1, and the last was seen November 3; the bulk left Des Moines, Iowa, November 8, and the last was seen November 10. At Mount Carmel, Mo., they were present in large flocks (100 to 200) for the first three days of August; they disappeared after August 15; re-appeared in flocks September 14; and five or six were seen December 5.

In the winter of 1884–'85 a few Grackles remained north of their usual winter range. One was seen all winter at Hennepin, Ill.; and at Paris, Ill., a female remained through all the cold season, feeding at a spring near the house of Mr. Balmer. At Mount Carmel, Mo., one was seen February 4, which had probably wintered near there, since no more were seen for a month. In studying the notes on the migration of this species many difficulties are encountered. Two distinct sets of notes were contributed from the region between latitude 38° and latitude 44°. As they do not harmonize any better by supposing that the Rusty Grackle had been confounded with the Bronzed in the east, or the Brewer's mistaken for it in the west, we can but give the two sets and let each reader draw his own inferences. The Bronzed Grackle, under the various names of Purple Grackle, Crow Blackbird, and a variety of Latin names, was reported as having been seen at Mount Carmel, Mo., March 2; Fayette, Mo., March 6; Glasgow, Mo., March 10; Grinnell, Iowa, March 9; Knoxville, Iowa, March 10; Unadilla, Nebr., March 11; Linwood, Nebr., March 10; Bonham, Tex., March 6; Gainesville, Tex., March 14; and Emporia, Kans., March 23. East of the Mississippi it was seen at Canton, Miss., February 24; Shawneetown, Ill., March 3; Paris, Ill., March 5; Aledo, Ill., March 6; Hennepin, Ill., March 13; Fernwood, Ill., March 14; Clinton, Wis., March 27; Lake City, Minn., March 26; New Richmond and Luck, Wis., April 3. Then, going right over the same ground again, we have a second series of notes. At Saint Louis, Mo., a few scattered Grackles were seen March 27; they were the first seen. Regular migration set in at 5 p. m., March 29. The same date the first was seen at Peoria, Ill, About sunset March 30, March 31, and April 1, thousands and thousands passed Saint Louis in immense flocks. During these same days they were noted for the first time at Keokuk, Richmond, Des Moines, Morning Sun, Coralville, Newton, and Waukon, in Iowa; Manhattan, Kansas; Lanesboro, and Heron Lake, Minn.; Rockford, Ill.; and Milwaukee, Wis. By this time the second wave had overtaken the first, and from stations farther north but one set of notes was received. These show that the first came to Rochester, Minn., April 3; Huron, Dak., April 4; Delavan, Wis., April 5; and that April 6 they reached La Crosse, Green Bay, and Durand, Wis., and Hastings and Elk River, Minn. Our northern border was crossed the middle of the month, and April 15 and 16 they appeared at Ossowo, Shell River, and Oak Point, Manitoba.

In the fall of 1885 the last was reported from Ossowo, Manitoba, October 24; River Falls, Wis., October 10; Grinnell, Iowa, November 21; Iowa City, Iowa, October 25; Des Moines, Iowa, October 14; Mount Carmel, Mo., November 26; and at Bonham, Tex., none were seen after August 16. The whole record from Saint Louis, Mo., is as follows: "September 17, too many present; October 27, a great day for migration, large flocks go south; October 28, another big day, an enormous flock seen at 9 a. m.; October 30, last flock."

512. Quiscalus macrourus. Swains. [275.] *Great-tailed Grackle.*

This species is an inhabitant of eastern Mexico and southern Texas. In the valley of the Lower Rio Grande it is an abundant resident. It was noted at San Antonio, Tex., by Mr. Atwater, who found it there as a summer resident, arriving about the middle of March.

513. Quiscalus major Vieill. [277.] *Boat-tailed Grackle.*

A strictly southern species, confined almost exclusively to the country near the south Atlantic and Gulf coasts, where it breeds abundantly. It is common in Texas and Louisiana, near the coast. It was reported correctly by a few of the most southern observers, and incorrectly by a score or more of the northern observers. All the "Boat-tailed Grackles" north of latitude 33° are Crow Blackbirds and belong to the preceding species. The habit which the male Bronzed Grackle has of carrying his tail "boat-shaped" during the breeding season is the common cause of the mis-identification.

514. Coccothraustes vespertina (Cooper). [165.] *Evening Grosbeak.*

The home of the Evening Grosbeak is in the northwestern part of the United States and British North America, from the Rocky Mountains westward, and while some pass south in winter, even to Mexico, others come eastward and are found in Manitoba and all the northern States as far east as Michigan. They have been found several times in Iowa and Nebraska, but so far there is one record only for Kansas, and that was made in 1877.

The winter of 1883–'84 was marked by an unusual abundance of these Grosbeaks. They came early and stayed late. At Minneapolis, which has long been known as one of their regular winter resorts, the first flock was seen November 7, containing about fifty individuals, and they remained all winter.

During the whole of the winter of 1883–'84 they were very common along the Mississippi River, from Minneapolis to the southern border of the State. They were reported from Minneapolis, Hastings, Red Wing, Lake City, and Lanesboro; in northeastern Iowa from Mitchell, and in central Iowa from Des Moines and Coralville. At Des Moines the bulk left the first week in March, and the last was seen March 23. They came to Lanesboro, Minn., about the middle of February, and by April 3 were among the most common birds in all the woods down the valley of the Root River for a few miles below town. These great numbers reached their height April 19, and even so late as May 13 the birds were still making the woods resound with their noisy notes. East of the Mississippi they were seen at River Falls and Green Bay, Wis. At the latter place they have been known to stay until May 30. At Portage La Prairie, Manitoba, the last was seen May 16.

In the fall of 1884 the first Evening Grosbeak, a male, appeared at Elk River, Minn., October 17; and a flock was seen at Vermillion, Dak., December 24.

In the spring of 1885 they were not nearly so common as during the previous spring. The notes seem to indicate wandering rather than migration. The records are as follows: Milwaukee, Wis., one seen March 28; Lanesboro, Minn., many males and females seen for the first time April 4 and left again in about a week; Heron Lake, Minn., seen March 12 and again the next day; Elk River, Minn., scarce during the winter of 1884–'85, two males seen February 25 and one female March 1. At Shell River, Manitoba, they were seen February 20, when the temperature was 40° below zero. In the fall of 1885 the first was seen at Elk River, Minn., October 30. They had previously been seen at Lanesboro, Minn., October 18, and were still there December 1.

515. Pinicola enucleator (Linn.). [166.] *Pine Grosbeak.*

A winter visitant from the north. All through the winter and spring of 1883–'84 the newspaper press of the country contained accounts of the presence of these birds in the Northern States, and occasionally of the straying of one a little farther south. The comparative rarity of the species and the bright color of the old males make them favorites among collectors, and wherever they go their ranks are rapidly thinned. In the Mississippi Valley they have been found as far south as Kansas (one instance) and Illinois. At Alda, in southeastern Nebraska, Mr. Powell took a female in May, 1882. The winter of 1883–'84 was not marked by special abundance at any point; in fact, the contrary was true, for they were rather less common than usual. They visited Ripon, Wis., and Mitchell, Iowa, and north of these points were seen at most of the stations. They left River Falls, Wis., March 15, and Red Wing, Minn., March 21. At Portage La Prairie, Manitoba, they were seen until April 10.

517. Carpodacus purpureus (Gmel.). [168.] *Purple Finch.*

The Purple Finch breeds in Manitoba and the Upper Mississippi Valley, and is a regular winter resident in the southern portion. The bulk pass the winter south of latitude 40°. At Caddo, Ind. Ter., in the winter of 1883–'84, they did not arrive until the real cold weather came; the first flock was seen January 10, and they were still present March 18. At Gainesville, Tex., an adult male was seen March 20.

The reports show that the species does not move northward with much precision, but arrives at favorite places long before it is seen at neighboring stations. For this reason no exact dates of movement can be given, and it can only be said that the species began to move out of winter quarters March 20 to 25, and that during the last week of March and the first week of April it passed up to latitude 45°; but during March a few individuals were found close to the Mississippi as high as latitude 44° 30′. On April 21 it appeared at Portage La Prairie, Manitoba. It breeds regularly from northern Minnesota and Dakota northward, but has also been found breeding in northern Illinois. Mr. Kline has taken one set of eggs at Polo, Ill.

To show how the composition of the flocks changes from time to time in the same place, we can do no better than reproduce Mr. Widmann's record from Saint Louis:

> During the winter of 1883–'84 flocks were found at their old stand. There were not so many as in the winter of 1882–'83, and crimson and plain birds were almost equally numerous. In cold weather they keep mostly on the ground, feeding on seeds of ash; in warm weather they ascend to the tree tops to feed on buds. February 23 there was a change in the flocks; they became larger, but there was a decrease in the number of crimson birds (that is, the old males), 75 per cent. being brown birds, the balance light crimson. March 17, flocks excited, mostly of brown birds, but singing. March 27, the bulk departed. April 19, the species still present in small flocks, mostly brown, but singing much. April 28, last regular migrants. May 5, an accidental party of eight or ten, all brown; May 7, a single brown bird seen.

During the winter of 1884–'85 a few Purple Finches were seen at Saint Louis, Mo., and at Shawneetown, Ill. At Des Moines, Iowa, a large flock was noted February 25, but no more were observed until regular migration began in March. The first migrants appeared at Saint Louis, March 3; Des Moines, March 14; Lanesboro, Minn., March 22; Hastings, Minn., March 31; Rockford, Ill., April 1; Green Bay, Wis., April 2; and Shell River, Manitoba, April 30. The whole record for 1885 at Saint Louis is:

> February 27, three brown individuals seen, winter visitants; March 3, first migrants, five, crimson; March 11, slight increase, scattered; March 31, first large flock, many crimson, and in full song; April 6 to April 16, bulk present; April 27, last.

In the fall of 1885 the first came to Green Bay, Wis., September 15; Lanesboro, Minn., October 17; and Mount Carmel, Mo., October 7.

The last was seen at Mount Carmel November 2. The first came to Saint Louis, Mo., September 17, and an increase was noticed October 17.

518. Carpodacus cassini Baird. [169.] *Cassin's Purple Finch.*

The usual home of this species is in the Rocky Mountain region, but it occurs in Texas. In the spring of 1884, at Gainesville, Tex., Mr. Ragsdale saw the first March 13.

521. Loxia curvirostra minor (Brehm). [172.] *American Crossbill.*

Both the Red and the White-winged Crossbills breed and are resident in Minnesota, and in winter come a little farther south, occasionally as far as Kansas. Though noted by the observers in their lists, yet not a single record was made during the winter of 1883–'84.

How different the record for 1885! The winter of 1884–'85 was marked ornithologically, in the Upper Mississippi Valley, by the great abundance of Crossbills of both species. They arrived at Paris, Ill., the middle of November (1884); increased daily, and in December the flocks contained from thirty to fifty birds. None were seen during January (1885), but they were in good force again February 3. The bulk departed in April, and the last were seen during the first week in May. At Shawneetown, Ill., the first came December 24, 1884; they were next seen March 25, and again April 2. No regular migratory movement can be traced, but they seem to have been most common in Wisconsin and Illinois the last week of March and the first half of April, and to have left early in May. In Milwaukee, thirty-nine birds were brought to one taxidermist March 28, and they were abundant for the next three weeks at Lake Mills, Wis. Several hundred were seen during the spring at Jefferson, Wis., and they were also noted at Durand, Green Bay, Ripon, Delavan, and Clinton, in Wisconsin, and at Rockford, Hennepin, and Odin, in Illinois. In Iowa they stayed all winter at Coralville, and were seen April 18 at Knoxville (fifty birds) and May 1 at Grinnell. The latest records are: Hennepin, Ill., May 18; Coralville, Iowa, May 21; and Milwaukee, Wis., May 25. Many of both species of Crossbills were seen at Elk River, Minn., the last week in March. In the fall of 1885 a flock re-appeared at Milwaukee, Wis., November 7.

521 a. Loxia curvirostra stricklandi Ridgw. (172 *a.*) *Mexican Crossbill.*

In the fall of 1885 numbers of these southwestern Crossbills invaded eastern Kansas. November 5 Prof. L. L. Dyche shot several from a small flock at Lawrence; November 21 Prof. D. E. Lantz killed three out of a flock of twelve at Manhattan; and December 23 Mr. V. L. Kellogg shot a pair out of a flock of twelve at Emporia (Revised Cat. Bds. Kansas, Goss, 1886, p. 40). At Lawrence Professor Dyche first observed the birds November 1 (1885), and he last saw them January 26 (1886). During this period he secured forty specimens, twenty of each sex. (The Auk, Vol. III, 1886, pp. 258–259).

522. Loxia leucoptera Gmel. [173.] *White-winged Crossbill.*

As noted under the Red Crossbill, no White-winged Crossbills were observed in the Mississippi Valley during the spring of 1884, but in the fall of that year they appeared at Elk River, Minn., and remained during the winter. In the spring of 1885 they were not so common as the Red Crossbill, but were noted at Durand, Wis., March 29; at Peoria, Ill., March 30; at New Richmond, Wis., April 3, and about a hundred were seen at Elk River, Minn., March 4. In Kansas it is a rare and irregular winter visitor (Goss).

524. Leucosticte tephrocotis Swains. [175.] *Gray-crowned Leucosticte.*

Breeds chiefly in the Rocky Mountain region north of the United States; south in winter to Colorado. According to Professor Aughey it is "frequently seen in Nebraska in winter, but rarely, if ever, in summer."

527 a. Acanthis hornemannii exilipes (Coues). [178*a*.] *Hoary Redpoll.*

Another Arctic bird which visits the Mississippi Valley in fall and winter. Mr. Seton (now Thompson) gave it as a tolerably common fall visitant to the Big Plain in Western Manitoba. It has been taken in northern Illinois.

528. Acanthis linaria (Linn.). [179]. *Common Redpoll.*

A winter visitant from the far north. The winter home of the Redpoll in 1883–'84 seems to have been confined principally to the country between the parallels of 41° and 44°, though the year before it was seen south to southern Illinois (at latitude 37° 30′). It is usually a winter visitor at Elk River, Minn., but Mr. Vernon Bailey writes that he saw none there from December 25, 1883, to January 17, 1884, when the temperature was 35° below zero. In the latter part of February the flocks began to grow restless and spread a little, and the first week of March the southernmost birds were crowding north. By March 10 all had gone. The first was recorded from Frazee City, Minn., on April 19, but probably reached that latitude a few days before. At Elk River, Minn., the species was numerous and many individuals migrated on April 3, and on April 7 the last one was seen. In the southern part of the State, at Lanesboro, the bulk and the last left March 29. At Portage La Prairie, Manitoba, the last was seen April 21.

In the fall of 1884 the first flock of Redpolls appeared at Elk River, Minn., November 1; the bulk arrived six days later, and they were common all winter.

In the spring of 1885 the Redpolls remained in the Mississippi Valley much later than in 1884. They were noted from Mount Carmel, Mo., April 1; Grinnell, Iowa, April 25; and Leeds Centre, Wis., May 9. In the fall of 1885 they reached Mount Carmel, Mo., November 4.

528 a. Acanthis linaria holbœllii (Brehm). [179*a*.] *Holbœll's Redpoll.*

Another northern species of rare or casual occurrence in the Mississippi Valley. Mr. Ridgway kindly informs me that he has examined specimens from northern Illinois.

528b. Acanthis linaria rostrata (Coues). [179*a*.] *Greater Redpoll.*

A northern species, rarely seen in the United States. The only instance of its capture within the Mississippi Valley is the record of a specimen taken November 2, 1878, at Chicago, Ill., by Mr. H. K. Coale.

529. Spinus tristis (Linn.). [181.] *American Goldfinch.*

The Thistle-bird or American Goldfinch is found in winter over most of the United States, and breeds throughout the greater part of its range except in the southernmost portions. In the winter of 1883–'84 it was reported from various stations up to northern Illinois, southern Minnesota, and southeastern Dakota. Considering the severity of the winter it is not to be wondered at that it was found no farther north, but had it been a mild, open winter, like that of 1877–'78, it would have remained almost at our northern boundary. About the middle or latter part of March records began to appear at points within their usual winter range where they had not been seen during the cold weather, showing that at this date the birds began to spread from their winter quarters. But it was late before the species began to advance beyond its ordinary winter limits. It seems not to have made up its mind to migrate until the last week in April, and then it was two weeks in getting fairly started. In Wisconsin the first came to West Depere May 14; in Minnesota they appeared at Pine Bend May 24. May 28 the species was seen at Portage La Prairie, Manitoba; the next day one was seen as far north as Oak Point, Manitoba. By far the larger part of the movement of this species took place in the last few days of April and the first days of May. The record from Saint Louis furnishes a full account of the movements from about the latitude in which the bulk winters. It was seen all winter in many places—not in flocks, but as scattered single birds.* These birds were very quiet, keeping on or near the ground, generally in company with Tree Sparrows, and all in plain winter dress. The first flock came February 24; they were in song. They remained in about the same numbers for more than a month; March 22 a flock of transients was seen going north. April 27 a flock of males in high dress began to arrive; the next day there was an increase from the arrival of the bulk of the males of the summer residents and transients; there were then more males than females. April 29 they were numerous and noisy, singing males attracting passing males which were seen descending. Another day and they were at the height of the season, Goldfinches everywhere, both males and females. May 5 the bulk of the males left; three days later the bulk of the females followed, and by May 10 the summer residents were in pairs and quiet reigned.

In the fall of 1884 the last Thistle-bird was seen at Mount Carmel, Mo., December 10; but none were noted at San Angelo, Tex., after September 7. Some of them remained north very late. They were quite abundant at Lanesboro, Minn., January 1, 1885, and were common at Minneapolis, Minn., during January. They left this latter place in February and did not return until March 29.

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* At Manhattan, Kans., directly west of Saint Louis, a thousand were seen in a single day, January 12.

In the spring of 1885 the records were very irregular, doubtless because of the erratic movements of the birds. Few, if any, remained during the entire winter north of latitude 39°; and though they began to move from place to place early in March, the bulk of their migration was performed in May. They reached Shell River, Manitoba, May 24. The whole record from Saint Louis is as follows:

> March 3, first, five in plain dress, silent; March 4, another party of six; March 5, a very large flock in the lowlands of Illinois, opposite Saint Louis; March 11, a few in much brighter colors and musical; April 10, still very scarce; only twice met since March 11; April 20 and 21, increasing, flocks of males in high dress; April 22, bulk arrived of both males and females; April 29, height of the season, large flocks; May 4, the bulk of transients departs; May 5, summer residents are scattering and mating.

In the fall of 1885 the records of "lasts" were: Green Bay, Wis., November 2; Milwaukee, Wis., November 26; and Mount Carmel, Mo., December 12. At Saint Louis, Mo., the bulk was still present October 10. At Gainesville, Tex., the first was seen August 7.

530. Spinus psaltria (Say). [182.] *Green-backed Goldfinch; Arkansas Goldfinch.*

The range of this western species within our district is limited to western Texas. It was only noted by Mr. Lloyd, who states that at San Angelo, Tex., it is a rare fall migrant.

530 a. Spinus psaltria arizonæ (Coues). [182*a.*] *Arizona Goldfinch.*

An inhabitant of northern Mexico, Arizona, and Texas.

530 b. Spinus psaltria mexicanus (Sw.). [182 *b.*] *Mexican Goldfinch.*

More than forty years ago Giraud claimed to have found this species in Texas. This record has been questioned, but its trustworthiness has been recently established by the Rev. Ira B. Henry, who re-discovered the species at Mason, Tex., where it is a rather common summer resident. A specimen sent to the Smithsonian Institution was pronounced to agree very closely with Giraud's type as undoubtedly *mexicanus.*

533. Spinus pinus (Wils.). [185.] *Pine Siskin; Pine Goldfinch.*

In Forest and Stream of December 7, 1882, Dr. Coues made the following statement concerning the habitat of this species:

> They breed throughout the British Provinces, northern Maine, New Hampshire, Vermont, New York, Michigan, and thence to Washington Territory in all the evergreen forests, and also breed in the Alpine regions of Oregon, California, Utah, Nevada, Idaho, Wyoming, Colorado, Arizona, Nevada, and New and Old Mexico. Some individuals may be found the year through in their summer abodes, while others spread in winter over all the United States in suitable places, unless the South Atlantic and Gulf States are to be excepted.

During the winter and spring of 1883-'84 and 1884-'85 they were observed at odd times at several of the stations, but their movements were so irregular as to preclude any definite tracing or timing of their migration. Colonel Goss shot two from a small flock near Wallace, Kans., May 29, 1883; and others were seen at Manhattan, Kans., as late as May 16, 1885.

Passer domesticus (Linn.). [——.] *European House Sparrow; English Sparrow.*

In Texas the English Sparrow is abundant at Galveston, Houston, and other points about Galveston Bay. In Louisiana it is common in the southeastern part of the State, and extends northward along the Mississippi as far as Saint Joseph. In Mississippi it is confined to the northern half of the State, and is said not to occur so far south as Vicksburg or Jackson. North of this region, and east of the Mississippi River, it occupies the whole of the Mississippi Valley up to latitude 45°. West of the Mississippi River it occurs in eastern Arkansas, north of the Arkansas River; is abundant over most of Missouri (except in the Ozark Hills), and Iowa (except the northwestern corner), eastern Kansas, eastern Nebraska, and southeastern Minnesota, and was reported from a single place in Dakota (Milltown). It generally appears first in cities and towns, whence it extends its incursions to the smaller villages and the currounding country, until finally it locates and breeds about farm buildings often many miles from any town. It is an enemy to agriculture.

Passer montanus (Linn.). [——] *European Tree Sparrow.*

Successfully naturalized in the vicinity of Saint Louis, Mo., where it is now abundant and on the increase.

534. **Plectrophenax nivalis** (Linn.). [186.] *Snow Bunting; Snowflake.*

From their breeding places within the Arctic Circle these warm-blooded Snowflakes come in countless thousands, beautifying and enlivening many a dreary winter landscape with the quick flashing of their wings and their cheery chatter. They commonly invade all of our district north of latitude 39°, and less often south to latitude 35°, where they are replaced by the Lapland Longspur. They are rare in Kansas (Goss). Most of the notes of our observers refer to their departure in the spring. At Saint Louis they have never been seen, and they are rare in Kansas. At White Hall, Ill., in the spring of 1884, they stayed until March 24. A little farther north, near latitude 42° and latitude 43°, they were seen as late as April 17, though the bulk left the first week in April. At latitude 45° the bulk left about the same time, but it was nearly May 1 before the last one departed. At Portage La Prairie, Manitoba, they did not disappear until May 25, and on previous years have been seen as late as June 22 when the weather was very hot.

In the fall of 1884 the first Snow Bunting appeared at Elk River, Minn., October 24, and the bulk arrived there November 11. At Lake Mills, Wis., the first was reported December 17. At Mount Carmel, Mo., the first was seen December 22, and the species became common four days later. A few were seen at Chicago, Ill., December 6.

In the spring of 1885 the last were reported from Chicago, Ill., March 14; Mount Carmel, Mo., March 24; Grinnell, Iowa, April 25, and Argusville, Dak., April 29.

In the fall of 1885 they returned to Elk River, Minn., October 9; Argusville, Dak., October 19, and Milwaukee, Wis., December 20.

536. Calcarius lapponicus (Linn.). [187.] *Lapland Longpsur.*

Like the last, a winter visitant from the far north. As has been already stated, the Mississippi Valley below the range of the Snow Bunting is occupied by the Longspur. In Kansas it is abundant. The limit of its known southern range has been carried south until we now know that it penetrates to Texas, where it has been found at Gainesville, leaving there in 1884 about March 1. Its mode of occurrence at Caddo, Ind. Ter., in the winter of 1883–'84 may be taken as a fair example of the way it comes and goes at pleasure. None were seen until a sudden cold snap in February covered everything with frozen rain. Horned Larks, Smith's Longspurs, and Chestnut-collared Buntings became abundant, and February 13 three Lapland Longspurs were seen. Starting out the next day to secure some of their skins I suddenly found myself surrounded by hundreds and hundreds of them. They fairly swarmed for a week; but on the night of February 19, taking advantage of a clear sky and a south wind, they disappeared, in company with all their long-clawed brethren, as suddenly as they had come. In Kansas they were very numerous about the same time, and a month later Nebraska became the scene of action for the evolutions of their mighty armies. In northern Minnesota they disappeared during the winter to give place to the Snow Buntings; and the first ones returned to Frazee City March 9. The last left Manhattan, Kans., March 22, while as late as April 19 thousands were seen at Chicago, but they left almost immediately afterward.

In the spring of 1885 the last flocks of Lapland Longspurs left Manhattan, Kans., February 21. At Newton, Iowa, large flocks moved north regularly every fine day from March 1 to March 12; and the last were seen there April 22. A large flock in spring dress was seen in Lanesboro, Minn., May 2, and the last at Heron Lake, Minn., May 9.

In the fall of 1885 a small flock was seen at Mount Carmel, Mo., November 2, and again November 20. The first was seen at Gainesville, Texas, November 14. In northwestern Manitoba the Lapland Longspur is "enormously abundant in May and September." (Seton, The Auk, Vol. II, 1885, p. 23.)

537. Calcarius pictus (Swains.). [188.] *Smith's Longspur.*

Smith's Longspur breeds in the far north and winters in the western part of the Mississippi Valley. It is common in southern Kansas, and its winter journeyings have been lately discovered to extend to Texas, where Mr. Ragsdale has found it at Gainesville during several winters. In the spring of 1884 the bulk left Gainesville March 5, and one was seen April 1. At Caddo, Ind. Ter., a little to the northeast of Gainesville, in a strictly prairie country, they were found to be an abundant and apparently regular winter visitor. Two flocks and many scattered birds were seen November 17, when there was hardly a sign of approaching winter and the leaves had not all fallen from the trees. They stayed through heat and cold, ice, snow, and rain, until the bulk left February 19, and the last on the 26th. East of the Mississippi the species extends in winter to the prairie regions of southern Wisconsin and northern Illinois, but its true home is in the extensive plains of the west and northwest. It does not breed within our limits. At Caddo a fine male was shot while sitting on a tree, the only one that was ever seen to alight elsewhere than on the ground.

In the spring of 1885 a specimen of Smith's Longspur was shot at Fayetteville, Ark., February 28, and sent to me for identification. At Des Moines, Iowa, about 50 were seen April 18. In the fall of 1885 the known winter range of the species was slightly extended to the southeastward by its appearance, November 10, at Bonham, Tex., where it was common November 16. At Gainesville, Tex., the first was seen November 14. In Manitoba it is abundant during the migrations, particularly in spring.

538. **Calcarius ornatus** (Towns.). [189.] *Chestnut-collared Longspur.*

This is one of the most abundant birds of the western Plains. It is resident in western Kansas and Nebraska, breeding north to high latitudes in summer, and wandering to southwestern Texas and Mexico in winter. In Manitoba it is a common breeder, but is somewhat local. It breeds commonly in Grant and Traverse Counties, in western Minnesota (Roberts & Benner). The most southeastern record probably is that from Warrensburgh, Mo., where it was rather common in April, 1874. (Scott, Bull. Nutt. Ornith. Club, Vol. IV, 1879, p. 143.) At Caddo, Ind. Ter., it was seen in the middle of February, 1884, in company with *C. pictus* and *C. lapponicus*. A question of the use and meaning of ornithological terms arises in connection with this and the following species. Mr. N. C. Brown, in his "Reconnaissance in southwestern Texas" (Bull. Nutt. Ornith. Club, Vol. VII, 1882, pp. 37–38), says that these two species, *C. ornatus* and *R. mccownii*, do not winter there because not found until February, and that the latter species is an uncommon migrant, taken between February 11 and 21. In our Mississippi Valley work we would call both of these species winter visitants, restricting the term "migrant" or "transient," which two terms are here used synonymously, to those birds which are found only as they pass through from a more southern to a more northern dwelling-place, or *vice versa*. At Gainesville, Tex., the bulk of the Chestnut-collared Longspurs began to leave March 12, and the last was seen April 24.

In the fall of 1884 a single Chesnut-collared Longspur appeared at Gainesville, Tex., November 3.

In the spring of 1885 they were common at Gainesville, Tex., March 5, and some may have wintered there. At Huron, Dak., the first were seen April 2; and at Menoken, Dak., April 15. A single bird was seen at Heron Lake, Minn., May 9. Dr. Agersborg states that it breeds sparingly in southeastern Dakota and abundantly 150 miles farther north.

539. Rhynchophanes mccownii. (Lawr.). [190.] *McCown's Longspur.*

This Longspur is more emphatically a bird of the western Plains than any of the preceding. There is only one record of its occurrence east of the Mississippi, it having been found accidentally at Champaign, Ill. The ordinary eastern limit of its range is near the edge of the Plains, in Dakota, Nebraska, western Kansas, and Texas. It does not go so far north as the other species, the Black Hills being near its northern limit. It breeds abundantly in west-central Dakota (Allen). It was found at Caddo, Ind. Ter., January 19, 1884. At Gainesville, Tex., it was recorded as a winter resident, leaving March 12; a small flock was seen March 26, an unusually late date. In western Texas it is an abundant winter resident (Lloyd). At Ellis, Kans., it was found to be a winter visitant and abundant in migration, but whether or not it breeds has not yet been determined.

In the fall of 1884 a flock of ten McCown's Longspurs appeared at Gainesville, Tex., November 5.

In the spring of 1885 two females were shot at Gainesville, April 9, and were the last seen.

In the fall of 1885 the first returned to Gainesville October 27, and it was common by November 2.

540. Poocætes gramineus (Gmel.). [197.] *Vesper Sparrow; Grass Finch.*

A common breeder from eastern Manitoba to southern Illinois, and a common migrant throughout the Southern States. In the eastern part of Concho County, Tex., Mr. Lloyd states that it is a tolerably common fall migrant. In northeastern Texas, at Gainesville, it was not found in winter; which fact agrees with Mr. Nehrling's statement, that none remain, so far as he knows, in the vicinity of Houston, Tex., during the winter. (Bull. Nutt. Ornith. Club, Vol. VII, 1882, p. 12.) At Gainesville they arrived March 4, and were seen until April 16. Just north of Gainesville, at Caddo, Ind. Ter., a single bird was seen February 25, but no more until the bulk came March 11. There is some doubt whether these Gainesville specimens are typical *gramineus* or the western subspecies *confinis*, but those from Caddo were certainly typical. At Pierce City, Mo., the first came March 17, and March 22 a pair visited Saint Louis. Then there was a pause, and the species apparently made no advance until the first week in April. April 10 it was seen at Lanesboro, Minn. It ranges north even to the Saskatchewan

River. It was reported as breeding at Newport, Ark., but its normal breeding range does not extend much south of southern Illinois.

In the fall of 1884 the last Grass Finch left Des Moines, Iowa, August 12, and the first appeared at Gainesville, Tex., October 8.

In the spring of 1885 a pronounced migration of this species took place about the 1st of April. It was first noticed at Saint Louis, Mo., March 30; at Hennepin, Ill., March 31; Delavan, Wis., April 1; and Manhattan, Kans., April 4. The Texas records were later. They are: Gainesville, April 6, and San Angelo, April 14. The advance near the Mississippi River was quite uniform. Newton, Iowa, was reached April 9; Leeds Centre, Wis., April 10; Lanesboro, Minn., April 16; New Richmond, Wis., April 14; Minneapolis, Minn., April 22; and Shell River, Manitoba, April 29. In the fall of 1885 the last one was seen at Elk River, Minn., October 3; Lanesboro, Minn., October 29; Saint Louis, Mo., October 21; and at Mount Carmel, Mo., October 28. At Gainesville, Tex., they were abundant November 17.

540 a. Poocætes gramineus confinis Baird. [197 *a.*] *Western Vesper Sparrow.*

This pale form of the Vesper Sparrow occurs on the high dry plains along our western border, and thence westward. Its eastern limit in the south is in the neighborhood of Gainesville, Tex., where specimens both of this subspecies and of typical *gramineus* have been taken by Mr. Ragsdale. Most of the specimens from Gainesville are intermediate in character, but from the one hundredth meridian westward, in Texas, typical *confinis* is the prevailing form. It breeds in western Texas (Lloyd). It is an abundant summer resident at Devil's Lake, Dak., and is the common form in central Dakota, as well as in the Traverse Lake region in western Minnesota, and throughout western Manitoba.

541. Ammodramus princeps (Mayn.). [192.] *Ipswich Sparrow.*

Breeds on Sable Island, off Nova Scotia, and occurs in winter along the Atlantic coast as far south as Virginia. A single straggler has been reported from Dallas, Tex., where, according to its label, it was killed December 10, 1884 (Sennett, The Auk, Vol. III, 1886, p. 135), but there is reason to suspect that the specimen really came from the coast of New England, the error having arisen from a transposition of labels.

542 a. Ammodramus sandwichensis savanna (Wils.). [193 *a.*] *Savanna Sparrow.*

This Sparrow breeds throughout the Mississippi Valley east of the Plains. It is said to winter from southern Illinois and southern Kansas southward, but none of the observers found it north of latitude 35°. It was found most abundantly about Caddo, Ind. Ter., and Gainesville, Tex., at which places both the typical species and the paler form, *A. alaudinus*, occur (one form remains abundant all winter, the other comes early in the spring). February 14, these Sparrows were very common at Caddo, Ind. Ter., though not more than five were found in a place. The morning of March 22 they were truly in the "height of the season." It had not been supposed that they ever appeared in such numbers.

Within a half mile from the house there were certainly not less than a thousand, and probably over two thousand, individuals. They could be seen and heard on all sides all the time. The next day the numbers remained the same, while the day following a walk over the same ground revealed two birds only. Considering the winter bird to be *alaudinus*, Mr. Ragsdale did not record *savanna* from Gainesville until April 7 and the last May 14.

Nearer the Mississippi they reached Pierce City, Mo., March 19, and Saint Louis March 22; but this bird was ahead of his mates, for less than half a dozen were seen before April 19. Des Moines, Iowa, was reached April 23, and Lanesboro, Minn., on the last day of the month. At Manhattan, Kans., directly north of Gainesville, it arrived April 21. The Savanna Sparrow usually breeds from latitude 40° northward, but Mr. Ridgway states that it breeds throughout Illinois, and Mr. Nehrling has found it breeding at Pierce City, Mo. Dr. Watson thinks that in former years he found it nesting at Ellis, Kans.

In the spring of 1885 not a note on the Savanna Sparrow came from any station east of the Mississippi River. At Manhattan, Kans., the first was seen April 1; Saint Louis, Mo., April 7; Grinnell, Iowa, April 22; Waukon, Iowa, May 4; Heron Lake, Minn., May 9; Huron, Dak., May 4, and White Earth, Minn., May 16. In the fall of 1885 the last was seen at Grinnell, Iowa, September 27, and the first at Emporia, Kans., October 10.

542 b. Ammodramus sandwichensis alaudinus (Bp.). [193 *b.*] *Western Savanna Sparrow.*

Common on the Great Plains and in western Manitoba. Mr. Ragsdale regards this form as the winter resident at Gainesville, Tex., where in 1884 it was most abundant February 26. By April 29 all had gone. In western Texas Mr. Lloyd determined it to be a common resident. Colonel Goss has taken it in western Kansas.

545. Ammodramus bairdii (Aud.). [191.] *Baird's Bunting.*

Baird's Bunting breeds in western Manitoba, Dakota, and western Minnesota. By what route it goes south is a question. Doctor Coues, writing ten years ago, said that it was extremely abundant in Dakota almost to the Red River of the North, and that all left in September. Where did they go? The species is not known to occur in Kansas; and if there is a Nebraska record I have failed to find it. Nevertheless, we are bound to believe that it does occur in both these States. Mr. G. H. Ragsdale shot one at Gainesville, Tex., April 24, 1884, and if it occurs in central Texas and Dakota it must perforce occur in the intervening country. At Caddo, Ind. Ter., it was not found, though I shot upwards of fifty Savanna Sparrows in the vain hope that some one of them would resolve itself into the wished-for Baird's. On March 31, among a lot of Savannas, I heard one singing with the trill at the end which

Doctor Coues says is the note of this species, but I was not able to find the bird. Its range is from New Mexico to British America, and it breeds abundantly in Dakota, along the Red River in Minnesota, and in Manitoba (particularly on the Alkaline flats along the Assiniboine River.—Seton).

In the spring of 1885 Baird's Bunting was not recorded from Kansas and Nebraska; but Mr. Lloyd found it to be a common winter resident at Fort Davis, Tex. It was noted in migration at Grinnell, Iowa, April 25; Menoken, Dak., May 12, and White Earth, Minn., May 16—at which latter place one was caught alive and kept in confinement for several days. At Grinnell, Iowa, it occurs in fall as well as spring.

546. **Ammodramus savannarum passerinus** (Wils.). [198.] *Grasshopper Sparrow; Yellow-winged Sparrow.*

Unlike most of the true Sparrows this bird does not go far north, scarcely reaching our northern boundary, and the great bulk remain from Iowa and Illinois southward, though it does breed in southeastern Dakota and western Minnesota. It is an abundant summer resident in Kansas. Its winter home is in the Southern States, and it has been found in winter as far north as southern Illinois. During the winter months it must be a very rare bird in Texas. Mr. Nehrling found a few at Houston. Mr. Brown, at Boerne, did not see one until February 14. Mr. Lloyd, at San Angelo, Tex., has never seen it in winter, nor has Mr. Ragsdale, at Gainesville. It was determined to be a very rare and probably accidental winter bird at Caddo, Ind. Ter., where, in the winter of 1883–'84, it was found in company with Lincoln's Sparrow; less than half a dozen individuals were seen previous to March 15, and by April 1 it was just beginning to be common. None were seen at San Angelo, Tex., until April 7, nor in the latitude of Gainesville until March 31, although in former years Mr. Ragsdale had found them March 8 to 10. A single straggler was seen at Manhattan, Kans., March 22, but the bulk did not come until May 1. April 30 they were seen at Saint Louis, and May 2 brought them to Alda, Nebr. Farther north than Alda but one record was made. This was at Chicago, Ill., where it was seen May 21.

In the fall of 1884 the bulk of the Yellow-winged Sparrows left Mount Carmel, Mo., September 15, while the last was not seen until October 12. At San Angelo, Tex., the first migrant appeared September 28.

In the spring of 1885 the first at San Angelo, Tex., was seen March 21; at Knoxville, Iowa, April 5; Des Moines, Iowa, April 13; Manhattan, Kans., April 18; Unadilla, Nebr., April 18; Newton, Iowa, April 21; Grinnell, Iowa, April 22; Saint Louis, Mo., April 27, and Lanesboro, Minn., May 2.

In the fall of 1885 the last at Grinnell, Iowa, was seen October 17; at Des Moines, Iowa, October 24, and at Saint Louis, Mo., September 14. At Gainesville, Tex., the first was seen November 2.

546 a. Ammodramus savannarum perpallidus Ridgw. [198 *a*.] *Western Grasshopper Sparrow.*

Rather common on the Great Plains from Dakota southward. Mr. Lloyd states that it is a resident in western Texas, and is tolerably common in fall in Concho County. A single specimen was killed at Boerne, Tex., by Mr. Brown. (Bull. Nutt. Ornith. Club, Vol. VII, 1882, p. 127.) Mr. Ragsdale writes that those taken at Gainesville, Tex., are intermediate in character, but nearer this subspecies than the typical form.

547. Ammodramus henslowii (Aud.). [199.] *Henslow's Sparrow.*

This is one of the rarer Sparrows of the Mississippi Valley. Ridgway says it is a common species on weedy prairies in Illinois, where it breeds, and in the southern part of which State it sometimes winters. It has been found in Kansas and Nebraska, and from thence southward. Mr. Scott found it breeding in western Missouri. (Bull. Nutt. Ornith. Club, Vol. IV, 1879, p. 143.) The only observer who has had the good fortune to meet it is Mr. Ragsdale, who recorded it as uncommon at Gainesville, Tex., where it was seen February 27, 1876.*

548. Ammodramus leconteii (Aud.). [200.] *Le Conte's Sparrow.*

This species is common over the western prairies, but is seldom noticed because of its habit of skulking in the grass, where it manages to keep well out of sight. It breeds in the Assiniboine Valley and in Dakota and Minnesota, and possibly in Illinois. In winter it ranges south through all the States west of the Mississippi to Texas, and has been found in numbers in Illinois, South Carolina, Alabama, and even in Florida. In the spring of 1884 Caddo, Ind. Ter., was the only station at which it was seen. Here its passage, for it did not winter, was very rapid. February 16 over a dozen were seen; two days afterwards the pastures were alive with them. A 640 acre field was as full of them as northern fence-rows ever are with Chipping Sparrows. Many left the night of February 19, and by March 1 all had departed. The nest and eggs of this species have been described by Ernest E. Thompson, from Manitoba (The Auk, Vol. V, 1885, p. 24), and by Dr. Agersborg, from Vermillion, Dak. (*Ibid.*, Vol. V, p. 280), but the two accounts are so entirely at variance that the question must wait for future settlement.

In the fall of 1884 the first Le Conte's Sparrow was seen at Gainesville, Tex., October 27.

In the spring of 1885 a Le Conte's Sparrow, which had been impaled by a Shrike, was sent me for identification from Fayetteville, Ark., where it was found February 28. At Saint Louis, Mo., one was shot April 1; it had not previously been known from that place. At Newton, Iowa, one was taken April 20.†

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* Since the above was written, Mr. Lynds Jones has found Henslow's Sparrow to be a tolerably common breeder at Grinnell, Iowa.—C. H. M.

† At Storm Lake, Iowa, during the latter of September, 1887, Dr. A. K. Fisher found Le Conte's Sparrow common, and secured specimens not yet wholly out of "first plumage," showing that they had been hatched in the neighborhood.—C. H. M.

In the fall of 1885 the first at Emporia, Kans., was seen October 2. It was not noticed at Gainesville, Tex., until November 30. It is a common fall migrant at Manhattan, Kans.

549. **Ammodramus caudacutus** (Gmel.). [201.] *Sharp-tailed Sparrow.*

An inhabitant of the salt marshes of the Atlantic and Gulf coasts. Mr. Nehrling said of its occurrence in southeastern Texas: "Observed near the coast of the Gulf of Mexico and Galveston Bay. Doubtless breeds." (Bull. Nutt. Ornith. Club, Vol. VII, 1882, p. 12.)

549 a. **Ammodramus caudacutus nelsoni** Alln. [201 *a.*] *Nelson's Sharp-tailed Sparrow.*

This bird is known principally from the Mississippi Valley, but is rare and local. It has been taken as a rare summer resident in eastern Kansas, and probably breeds in southern Kansas. It breeds in northern Illinois and probably winters in southern Illinois. It has been taken at Saint Louis, Mo.*

550. **Ammodramus maritimus** (Wils.). [202.] *Seaside Finch; Seaside Sparrow.*

An inhabitant of the salt marshes of the Atlantic and Gulf coasts, from Massachusetts to Texas.

552. **Chondestes grammacus** (Say). [204.] *Lark Finch.*

This Sparrow is a prairie bird, and it occurs as far east as the prairies extend across Iowa, Illinois, Wisconsin, Ohio, and Texas (even to the neighborhood of Houston in southern Texas, where it breeds abundantly.—Nehrling). It is rare in Manitoba. Dr. Agersborg states that at Vermillion, Dak., three broods are often raised in a season. It winters quite far south, being found in Mexico; a few winter in southern Texas. In Kansas it is an abundant summer resident. Its migration is late but rapid. In the spring of 1884, at Gainesville, Tex., it appeared April 5. By April 17 it had covered southern Missouri and southern Illinois to latitude 39° 19′. April 24 it had reached latitude 42° in Iowa, and April 30 it was seen at Waukon, Iowa, and Vermillion, Dak. May 3 and May 4 it appeared at Lanesboro, Minn., and West Depere, Wis., but north of these points the records were not regular enough to be of value. Computation based on the above data shows that the species migrates at an average rate of about 30 miles a day over a distance of nearly a thousand miles. The average of the records indicate that the arrival of the bulk is about six days behind that of the first.

In the fall of 1884 the bulk of the Lark Finches left Mount Carmel, Mo., August 20, and the last were seen there a week later.

In the spring of 1885 no records came from the stations east of the Mississippi River. The average speed of migration of this species in

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* Mr. Vernon Bailey has recently found it breeding at Fort Sisseton and Devil's Lake, Dak.—C. H. M.

1885 was even greater than in the previous year. It reached Gainesville, Tex., March 28; Saint Louis, Mo., April 16; Manhattan, Kans., and Des Moines, Iowa, April 18. April 20 and 21 it appeared at Newton, Iowa; Laporte City, Iowa; Lanesboro, Minn., and Lake City, Minn. Mr. Atwater says that at San Antonio, Tex., they always nest in trees, probably for protection against snakes. At Red Rock, Ind. Ter., I used to find them more often on trees than on the ground, while at Manhattan, Kans., Prof. Lantz says they usually nest on the ground, but occasionally in trees. In the fall of 1885 the last at Grinnell, Iowa, was seen September 27, and at Mount Carmel, Mo., October 17. The first arrived at Bonham, Tex., October 17, and they were common there October 22.

552 a. Chondestes grammacus strigatus (Swains.). [204 *a.*] *Western Lark Finch.*

Mr. Lloyd states that this subspecies is an abundant summer resident in western Texas, where it raises two broods, nesting in bushes and on the ground. The most eastern record within our district is from Gainesville, Tex., where Mr. G. H. Ragsdale secured it. But the majority of the specimens from that locality are intermediate in character. At San Angelo, in 1884, it was first seen April 1, and last seen October 3. In 1885 it reached San Angelo March 24.

553. Zonotrichia querula (Nutt.). [205.] *Harris's Sparrow.*

The habitat of this species has lately been determined with much more accuracy than formerly; indeed, the larger part of our knowledge of Harris's Finch has been obtained during the last twelve years. Its eastern limit is well known; there is no Louisiana nor Arkansas record; in western Missouri it is common, and it passes eastward to about the middle of the State, the most eastern record being that of Mrs. Musick, at Mount Carmel, Mo., where both the first and the bulk arrived April 3, 1884; hence it is probable that the species will yet be found in northwestern Arkansas. In Iowa it ranges a little farther eastward, being common in western and middle Iowa, and a straggler has been taken at Mitchell, Iowa, near the Wisconsin line. It has even wandered twice to Illinois. The whole of Minnesota is included in its range, as there are records from the four corners of the State, and in the fall of 1883 it was taken at Trempealeau, Wis. The northern limit of its distribution is not yet known, but it extends far into British America. In the south it has not been found in southeastern Texas, though it is a common winter bird in southwestern Texas. Its range is thus seen to agree in general outline with that of the Lark Finch, were the latter moved two degrees to the west. The most western record that has come to notice is from Ellis, Kans.

This is one of the species that did not go into winter quarters in the winter of 1883–'84 until the cold weather of the first week in January. Previous to that it had been marked as abundant at Pierce City, Mo., and at Manhattan, Kans., but after January 2 none were seen at Pierce

City and not many at Manhattan. Its usual winter home is in southern Kansas, the whole of Indian Territory, and northern Texas. Mr. Lloyd states that it is a rare fall migrant in eastern Concho County, Tex. In the spring of 1884 the northward movement commenced about the 1st of March, and the bulk left Gainesville, Tex., March 12. Three days later the transients were at their height at Caddo, Ind. Ter. Those which spent the winter at Caddo left March 10. The bulk arrived at Pierce City, Mo., March 17, and the next day at Manhattan, Kans. At Alda, Nebr., they were seen March 23, and then for more than a month there was no advance. They appeared at Vermillion, Dak., May 3, and just two weeks later at Argusville, Dak. It had been previously recorded (May 10) by Miss Gertrude M. Lewis, at Frazee City, Minn. The bulk seldom moves more than four or five days behind the van. Some very late migrants were noted. One was seen at Gainesville, Tex., May 5, and at Manhattan, Kans., May 20. It is surprising that a species which migrates so late should not stop to breed on this side of the boundary line. It has never been found breeding in the United States, nor indeed anywhere, for the nest and eggs are unknown. Mr. Abbott saw a male at Turtle Creek, in central Dakota, in the latter part of July, 1881, but saw no signs of breeding, and though Prof. Aughey says he has often seen young in northeastern Nebraska, it is practically certain that it does not breed within that State. If it breeds anywhere in the United States it probably does so in northern Minnesota. Dr. Hatch says that specimens have come under his notice with ovulation so far advanced that he has no doubt they breed in the northeastern part of that State. A curious circumstance connected with its migration in the spring of 1884 was its entire absence from the vicinity of Ellis, Kans., where it is usually present both spring and fall, and sometimes in great abundance. Dr. Watson writes that in his study of migration at that point, extending over several years, nothing has struck him so forcibly as the great disparity in the numbers of the several species in different years, as if they visited Ellis merely from caprice; they are abundant one year, few or wanting the next, common in spring, scarce in the fall, and *vice versa*.

In the fall of 1884 the first Harris's Sparrow appeared at Des Moines, Iowa, October 18; the bulk arrived October 25 and departed on the same day, and none were seen there afterwards. The first came to Gainesville, Tex., November 5. A few remained all winter as far north as Manhattan, Kans. (latitude 39° 27′), and as far south as San Antonio, Tex. (latitude 29° 27′), these two parallels forming the limits of the winter range.

In migration in the spring of 1885 it was seen at Mount Carmel, Mo., April 28; Des Moines, Iowa, April 25; Lanesboro, Minn., May 10; Heron Lake, Minn., May 12; and Shell River, Manitoba, May 15. About forty were seen at White Earth, Minn., May 16, the first having arrived a day or two before. At Gainesville, Tex., the last was seen May 5; at Mount Carmel, Mo., May 3; Des Moines, Iowa, May 13; and Manhattan, Kans., May 23.

In the fall of 1885 migrants appeared at Elk River, Minn., September 21, where they remained but one week. They came to Lanesboro, Minn., September 27, and Iowa City, Iowa, October 17, and were not seen afterwards. They reached Emporia, Kans., October 6, and Gainesville, Tex., November 6. At the latter place they became common November 14.

554. Zonotrichia leucophrys (Forst.). [206.] *White-crowned Sparrow.*

Winters in the Gulf States and southward; migrates through the Mississippi Valley, and breeds in the Rocky Mountains and British America. In the spring of 1884 only fifteen observers sent reports concerning the movements of this species. From such limited data but little can be learned of its migrations. At San Angelo, Tex., it was reported as an abundant winter visitor. It remained abundant on April 8, and did not finally depart before May 19, when the last was seen. At Caddo, Ind. Ter., it appeared from the north November 9, was abundant until the weather became quite cold, and rare afterward; two were seen February 23, the last March 11.

At Saint Louis it was first seen February 24, and perhaps wintered. March 17 a party of four adults arrived; April 17 it was still very scarce, one party in a new place; April 18 a new party arrived, singing; April 29 the bulk arrived; April 30, height of the season; May 5, bulk continued, but numbers smaller than in preceding years; May 12, bulk departed; May 17, last. At Pierce City, Mo., they were abundant in fall migration; March 17 they were rare; April 16 the bulk departed; April 20 few were left. At Danville, Ill., the first arrival was noticed April 18; at Chicago, May 3; at Polo, Ill., the bulk came April 28. By May 7 it had appeared at West Depere, Wis.

Farther west, at Morning Sun, Iowa, it arrived April 5; at Red Wing, Minn., April 30; at Minneapolis, Minn., May 12. At Manhattan, Kans., about a dozen were seen April 26, and none afterward. At Vermillion, Dak., they arrived in numbers May 3, and by May 5 they reached Oak Point, Manitoba.

In the fall of 1884 the first White-crowned Sparrow appeared at Mount Carmel, Mo., October 9. It became common there the next day and left October 12. At San Angelo, Tex., the first was seen November 30, and at Gainesville, Tex., October 22. They were common all winter at San Antonio, Tex., and probably wintered near Emporia, Kans., since they were seen there February 14.

In the spring of 1885 the van of migration reached Saint Louis, Mo., April 22; Peoria, Ill., May 7; Hennepin, Ill., May 8; Lanesboro, Minn., May 10; and Heron Lake, Minn., May 16. They remained at San Antonio, Tex., until May 3. At Mason, Tex., they were seen for the last time May 4; at Gainesville, Tex., May 7; Pierce City, Mo., May 10; Saint Louis, Mo., May 15; and Mount Carmel, Mo., May 18.

In the fall of 1885 the last were seen at Lanesboro, Minn., October 7. They arrived at Saint Louis, Mo., October 6; increased there October 14; were numerous and musical October 26, and left November 11. At Emporia, Kans., the first were seen October 6.

555. Zonotrichia intermedia Ridgw. [207*a*.] *Intermediate Sparrow.*

Breeds in the far north, coming south in winter through the Western States to Mexico. During migration it is not uncommon as far east as the eastern edge of the plains. In middle and western Kansas it is common. Middle Kansas is not the extreme eastern limit of the range of the Intermediate White-crown. A single specimen was reported from Iowa years ago, and in 1871 Dr. Hoy took one near Racine, Wis. Several specimens have been taken, both in spring and fall, as far east as Minneapolis, Minn. (Bull. Nutt. Ornith. Club, Vol. IV, 1879, pp. 153, 154). It is a common winter resident in Tom Green County, Tex., and must frequently appear at points between Texas and western Kansas. It seems to prefer localities along the railroads where sunflowers and weeds have sprung up. Let all our observers be on the lookout for it. It is the more liable to be overlooked as it arrives after the other, and without close examination is naturally mistaken for it. In the fall of 1883 the first specimen was taken at Manhattan, Kans., by Prof. D. E. Lantz, October 9, at least a week after the ordinary White-crowns had passed southward. A few days later Col. N. S. Goss found them common at Wallace, Kans., much farther west. In the spring of 1884, at Manhattan, two of the same species were found, May 7. This was eleven days later than the migration of the White-crown. In the spring of 1885 several were seen at Manhattan, May 6.

557. Zonotrichia coronata (Pall.). [208.] *Golden-crowned Sparrow.*

A bird of the Pacific coast region, coming east in migration to the Rocky Mountains. A straggler was obtained at Racine, Wis., by Dr. Hoy.

558. Zonotrichia albicollis (Gm.). [209.] *White-throated Sparrow.*

Breeds in Manitoba and the northern part of the Mississippi Valley, and winters in the southern part. In the spring of 1884 twenty-nine observers sent reports concerning the movements of the well-known Peabody Bird. These reports seem to show that the species is far less abundant here than farther east. Gainesville, Tex., is the most southern point from which it was reported. Here a single bird was seen February 26. At Caddo, Ind. Ter., and a little farther east, it was common all winter, and February 23 it was as numerous as in November and January; March 15 a flock was seen; March 25 the last was seen. At Pierce City, Mo., the first was noted February 20, and the bulk departed April 16. At Saint Louis they were rare during the winter; a flock was seen December 28, but none were at the same place December 29. The first migrants arrived February 24, a few only; March 17 the numbers had doubled from six in a party to twelve; March 23 they had doubled from twelve to twenty-four, a few among them being in high plumage, and many in song. April 1 the same numbers were in the same places; the spring molt was progressing rapidly and the plumage was assuming higher colors. April 15 there was no change. April 17 birds in high dress arrived; April 18 they were noisy and conspicuous. By April 25 the highly colored birds had departed; flocks remained in plain dress and singing but little. The bulk continued until May 11, when great numbers of young, mostly plain females, arrived; song not often heard. May 12 the bulk departed; May 17 the last was seen.

The first movement northward, about February 24, did not extend far. Another began about March 10, when the first arrived at Fayette, Mo.; on the following day a stray one reached Chicago. March 15 the first arrived at Danville, Ill., and about this time the numbers increased at Saint Louis.

A third movement, though not as extensive, began March 27, when the first arrived at Polo, Ill. April 9 the first was seen at Newton, Iowa. Two days later, April 11, the first arrived at Red Wing, Minn. April 25 the first and only ones seen in spring migration were observed at Manhattan, Kans. April 28 they appeared at Elk River, Minn.; April 30 at Vermillion, Dak; and May 10 at Frazee City, Minn. At Green Bay, Wis., the bulk arrived May 4. At Coralville, Iowa, the bulk arrived April 29, and left May 7, and the last was seen May 15. At Waukon, Iowa, more than a hundred miles farther north, the last was seen May 17. At Lanesboro, Minn., the bulk arrived April 30; the height of the season was from April 30 to May 12; the bulk passed northward May 20; and the last one was seen May 25.

Thus the last great movement of this species began about April 25, and was at its height during the first week of May. The bulk reached Minneapolis, Minn., May 1; Elk River, Minn., and Vermillion, Dak., May 3; and Frazee City, Minn., May 12. At Argusville, Dak., none were seen in the spring of 1884.

The line of migration of this species seems to follow the two great rivers, the Mississippi and Missouri, and the timber belts along them. Observers in the prairie regions rarely see them.

In the fall of 1884 the first White-throated Sparrow was seen at Elk River, Minn., September 22, and the bulk arrived September 27; the last was seen there October 5. At Mount Carmel, Mo., the first was seen September 27, and the last October 28. The first was seen at Gainesville, Tex., November 13. A party of four was found March 4, 1885, in the lowlands of Illinois, opposite Saint Louis, Mo., where they had probably wintered. Other individuals, which had possibly wintered in the vicinity, were seen at Saint Louis March 10 and March 25, and at Shawneetown, Ill., March 18.

In the spring of 1885 regular migration did not begin until the last two days of March. The first White-throated Sparrow arrived at Paris, Ill., April 8, and at Emporia, Kans., April 18. The three days from April 20 to 22 were days of great movement, and the species was noted from Hennepin, Ill.; Mount Carmel, Mo.; Iowa City, Iowa; Waukon, Iowa; Lanesboro, Minn.; Chicago, Ill.; Leeds Centre, Wis.; and Elk River, Minn. By May 6 it had reached Shell River, Manitoba. None were seen at Pierce City, Mo., after May 9; Mount Carmel, Mo., after May 10; Saint Louis, Mo., May 22; Des Moines, Iowa, May 12; Coralville, Iowa, May 10; Grinnell, Iowa, May 10; Waukon, Iowa, May 14; Lake City, Minn., May 15; River Falls, Wis., May 19; and Lanesboro, Minn., May 25. At Saint Louis, Mo., the bulk of old birds arrived April 20; the height of the season was reached April 29; the bulk of old birds departed April 30, and the bulk of young birds May 12.

In the fall of 1885 the record of this species was more extended than that of any other. It appeared at Elk River, Minn., September 2; Lanesboro, Minn., September 18; River Falls, Wis., September 18; Grinnell, Iowa, September 28; Iowa City, Iowa, October 3; Des Moines, Iowa, October 3; Saint Louis, Mo., October 5; Emporia, Kans., October 7; Mount Carmel, Mo., October 8; and Gainesville, Tex., October 31. The last was reported from Elk River, Minn., October 8; River Falls, Wis., October 14; Lanesboro, Minn., October 18; Iowa City, Iowa, October 17; Des Moines. Iowa, October 26; Grinnell, Iowa, October 27; and Mount Carmel, Mo., November 4. The full fall record from Saint Louis is as follows:

> October 5, first; October 6, numbers in high dress, singing; October 10, bulk arrived; October 12, present in great numbers; October 17, height of the season, all patterns of color present, song continuously heard; October 20, those in high dress gone, numbers of plain birds present; October 27, great numbers in flocks; November 11, still numerous.

559. Spizella monticola (Gmel.). [210.] *Tree Sparrow.*

The Tree Sparrow breeds in the far north. In the Mississippi Valley it is one of the most abundant winter birds from latitude 43° south to latitude 34°. At Caddo, Ind. Ter., in the winter of 1883-'84, it outnumbered the Junco, or Slate-colored Snow-bird (*Junco hyemalis*), but in the heavy timber was less numerous than the White-throated Sparrow. The first was seen October 31, and it was abundant until February 26, when a large number departed; the remainder disappeared March 10. At Saint Louis it was the most abundant winter bird next to the Junco. It was not so numerous in January and February as in December; the flocks seemed to have thinned out, but kept their stands and began to sing and go up into the trees during the warm period of the first of February. About 50 per cent. left February 24, and the bulk followed March 17. Just before this they had been much excited, singing and mating. March 22, small flocks were still present, but quiet; the last was seen March 27. At Manhattan, Kans., it was an abundant winter visitor, arriving December 1 and remaining in numbers during the entire winter. March 8 about two hundred were seen; the height of migration was noted March 15 and the last a week later. It was abundant at Vermillion, Dak., where it began to sing March 24; all had left, apparently, April 30, but a single bird was seen May 3. During the winter it was found, though in smaller numbers, at Heron Lake and Lanesboro, Minn. February 23 and February 24 the first pronounced general movement was felt at Saint Louis and Lanesboro; but while it was a wave of departure at Saint Louis it was one of arrival at Lanesboro. This movement does not seem to have extended farther north than Lanesboro, and in many places probably the relative number of birds was left undisturbed. The first arrival at Waupaca, Wis., was noted March 24, at which time the species was exceedingly abundant at Iowa City and Lanesboro. By March 29 it had become abundant at Minneapolis and Elk River, Minn, where it arrived in large numbers on that and the preceding day. April 1 it arrived at West De Pere and Green Bay, Wis., and April 2 it reached Frazee City, Minn. It was noted at Portage la Prairie, Manitoba, April 15. At Milwaukee it did not appear in large numbers before April 26, ten days after the bulk had left Des Moines, Iowa. At West De Pere, Wis., it remained abundant until May 6.

In winter the center of abundance is along latitude 39°, south of which it reaches to latitude 34°, being found but rarely in the Gulf States east of Texas. Caddo, Ind. Ter. (lat. 34° 11′), is about as far south as the species winters in any numbers.

In the fall of 1884 the first Tree Sparrow appeared at Elk River, Minn., October 9; while the first was not reported from Hastings, Minn., until November 30. At Elk River the bulk arrived October 13 and left November 1. The first was reported from Des Moines, Iowa, November 15, and from Mount Carmel, Mo., November 13. The bulk arrived at Mount Carmel November 11. There can be no doubt about the cold-enduring powers of this bird. At White Earth, Minn. (lat. 47° 04′), on New Year's Day, 1885, a flock came around the house seemingly in excellent health and spirits, though the mercury indicated thirty-five degrees below zero. There was no other record of its wintering north of latitude 44°. Many were seen at Lanesboro, Minn., February 6.

In the spring of 1885 the bulk of migration took place in the ten days from March 30 to April 8, but the records were too irregular to admit of tracing the movements of the van. The first was seen at Elk River, Minn., April 2, and at Shell River, Manitoba, April 10. At Saint Louis, Mo., the last was seen April 2; at Grinnell, Iowa, April 5; Waukon, Iowa, April 9; Manhattan, Kans., April 12; New Richmond, Wis., April 18; Huron, Dak., April 18; Lanesboro, Minn., April 24; and Elk River, Minn., May 11. The Tree Sparrow is not known to breed south of our northern boundary. In the fall of 1885 the first returned to River Falls, Wis., October 17; Lanesboro, Minn., October 18; Grinnell, Iowa, October 27; Des Moines, Iowa, October 29; and Saint Louis, Mo., November 12.

559 a. Spizella monticola ochracea Brewst. [210, part.] *Western Tree Sparrow.*

The Western Tree Sparrow breeds in Alaska and migrates over western North America, coming as far east as Dakota, western Kansas, and middle Texas. It has been taken at Gainesville, Tex., by Mr. Ragsdale. In Concho and Tom Green Counties, Tex., it was common in small flocks in the winter of 1884–'85 (Lloyd).

560. Spizella socialis (Wils.). [211.] *Chipping Sparrow.*

Rare in western Manitoba, but a common summer resident in the Mississippi Valley. The winter home of this Sparrow is in the Southern States and Mexico, but Mexico receives the larger number. Mr. Ridgway queries its occurrence in Illinois in winter, and at Caddo, Ind. Ter., in the winter of 1883–'84, it was a very rare winter bird; less than half a dozen were observed during the entire cold season. On the northward journey it reached latitude 37° at Pierce City, Mo., March 19; the next day it was seen at Fayette, Mo., and two days later at Saint Louis. It seems probable that the normal advance, after being delayed by the snow-storms of the early part of April, reached latitude 42° about April 15; West De Pere, Wis., April 18; and Hastings and Elk Lake, Minn., on the 21st. It was also noted from Portage la Prairie, Manitoba. There were many irregular records. Considerable uncertainty attaches to the records of this species, because it is often confounded with the Tree Sparrow and the Field Sparrow. The bulk travels about two weeks in the rear of the advance guard.

In the fall of 1884 the bulk and the last left Des Moines, Iowa, October 9.

In the spring of 1885 about one-half of the records contributed on the migration of the Chipping Sparrow seem to be mistakes, and most of the rest are too irregular to be of much value. The following are probably correct: At Saint Louis, Mo., the first was seen March 30; at Shawneetown, Ill., April 1; Manhattan, Kans., April 4; Lanesboro, Minn., April 14; and Minneapolis, Minn., April 24. The whole record from Saint Louis is as follows: "March 30, first, silent, on ground; March 31, four males in song; April 1, still increasing; April 2, bulk of males present, and first females; April 5, bulk of females arrived; Chippies numerous and noisy; April 17, height of the season; April 23, Chippies in pairs."

In the fall of 1885 none were seen at River Falls, Wis., after October 6; nor at Iowa City, Iowa, after October 17. At Saint Louis, Mo., migration was in full progress October 7. The last flock was seen October 21, and the last individual October 31. The first arrived at Bonham, Tex., October 14, where they were common by October 19.

560 a. Spizella socialis arizonæ Coues. [211 *a.*] *Western Chipping Sparrow.*

This Western sparrow was first taken in Texas by Mr. N. C. Brown, who found it at Boerne. It comes as far east as Gainesville, Tex., where Mr. Ragsdale shot one April 24, 1884, which was molting. The last was seen there May 15. Mr. Lloyd states that this Sparrow is a resident of Tom Green County, Tex., where it is "tolerably common in winter; rare in summer." In the fall of 1884, at Gainesville, Mr. Ragsdale found the first November 3.

In the spring of 1885 the first returned to Gainesville May 12; but Mr. Lloyd, at San Angelo, had already (May 8) found a nest with four well incubated eggs.

561. **Spizella pallida** (Swains.). [212.] *Clay-colored Sparrow.*

Breeds from northern Nebraska, central Iowa, and northern Illinois northward, and is very abundant in western Manitoba. Its winter home seems to be south of central Texas, where Mr. Lloyd states that it is an abundant spring and fall migrant. Nehrling recorded it as abundant in winter in eastern Texas, near Houston, and Merrill as an abundant winter resident in the Lower Rio Grande Valley. In the spring it journeys north to British America and east to Missouri, Iowa, Illinois, and Wisconsin, being most abundant on the plains, and thence west to the Rocky Mountains. In western Kansas it is a common migrant. All the reliable records in 1884 came from the West, but they are so irregular as to preclude any timing of the migration. They show, however, either that the migration was very late, or that Dr. Coues put the time too early when he said, in his "Birds of the Northwest," that they arrive in northern Dakota the latter part of April. In the spring of 1884 the record was as follows: At Gainesville, Tex., the first and only one was seen May 13; at Ellis, Kans., it was abundant May 13; at Manhattan, Kans., the first was noted April 30, the height of the season May 14, the last May 15. At Alda, Nebr., the first was seen May 3; at Vermillion, Dak., the bulk arrived May 8; at Des Moines, Iowa, a male was shot May 10. At Minneapolis, Minn., one was shot May 12, and May 24 about one hundred and fifty were seen.

In the fall of 1884 the Clay-colored Sparrows reached Gainesville, Tex., November 3.

In the spring of 1885 a flock was seen at San Angelo, Tex., March 26; at Manhattan, Kans., May 4; Heron Lake, Minn., May 9; New Richmond, Wis., May 11; and more than a hundred and fifty were seen at White Earth, Minn., May 16. They reached Shell River, Manitoba, May 18. The record for 1885 thus bears out that of the previous year in determining that May, and not April, is the month for the arrival of this species in the Upper Mississippi Valley. At White Earth, Minn., they breed in great abundance. At San Angelo, Tex., the last was seen May 1; and at Manhattan, Kans., May 10. In the fall of 1885 the first returned to San Angelo, Tex., October 1.

562. **Spizella breweri** Cass. [213.] *Brewer's Sparrow.*

The Clay-colored Sparrow is represented in the western part of the United States by a near relative, Brewer's Sparrow. Mr. Brown took a single specimen at Boerne, Tex., March 5, 1880. Mr. Lloyd states that it is tolerably common in fall in Tom Green County, Tex., and winters abundantly in Pecos County. Mr. Ragsdale took a single specimen at Gainesville, Tex., during the spring of 1884.

563. Spizella pusilla (Wilson). [214.] *Field Sparrow.*

The Field Sparrow breeds from Indian Territory and southern Illinois northward nearly to the boundary, and occurs rarely in Manitoba. It has been taken in summer in central Mississippi, and may yet be found to breed far south. In eastern Kansas it is a common summer resident (Goss). It may be called one of the "half-hardy" Sparrows. It easily endures the winters as far north as southern Illinois, and is common from Illinois southward, but does not undertake to expose itself to the rigors of a real northern winter. In the winter of 1883-'84, at Caddo, Ind. Ter., it was one of the common winter residents, in company with Tree and White-throated Sparrows, and the first of the transients came February 20 to February 23. At Gainesville, Tex., it was marked as abundant February 26. In Concho County, Tex., it is tolerably common in fall and rare in winter (Lloyd); and in eastern Texas, near Houston, it is not uncommon in winter (Nehrling).

In the spring of 1884 a single male was seen at Saint Louis February 19, but no more for a month. Real migration seems to have begun about the middle of March, and March 17 it was seen at Saint Louis, Mo., and Griggsville, Ill. It was recorded from southern Iowa April 1, and reached the northern part April 5. The most northern record was from Lanesboro, Minn., April 14. On the plains the migration was later. Manhattan, Kans., and Vermillion, Dak., reported it April 21 and April 22, but Professor Lantz says it was not common at Manhattan until May 1.

In the fall of 1884 the bulk of Field Sparrows left Mount Carmel, Mo., October 7, and the last was seen October 22.

In the spring of 1885 a very early bird was seen at Saint Louis, Mo., March 2; the first came to Pierce City, Mo., March 8; and the second appeared at Saint Louis, March 10. At Manhattan, Kans., the first was seen March 26. The bulk came to Saint Louis, March 30 and March 31. April 4 and April 5 it was recorded from Mount Carmel, Mo.; Grinnell, Iowa; Newton, Iowa; Waukon, Iowa; and New Cassel, Wis. As in 1884, so in 1885, its most northern record was Lanesboro, Minn., where it was seen April 18. It has been known, however, to range in Wisconsin to latitude 44° 30′.

In the fall of 1885 the last at Grinnell, Iowa, was seen September 28; at Iowa City, Iowa, October 15; and at Mount Carmel, Mo., November 2. At Saint Louis, Mo., many were seen in flocks October 5; they had decreased October 20; the bulk left November 11, and the last was seen November 12. At Bonham, Tex., the first was seen October 16, and by October 19 they had become common.

563 a. Spizella arenacea (Chadbourne). [——] *Western Field Sparrow.*

This new Sparrow was described by Mr. Arthur P. Chadbourne from specimens collected at Laredo, Tex., during the fall and winter of 1885–'86 (The Auk, Vol. III, 1886, p. 248). More recently Mr. Lloyd has found it in winter in Tom Green and Concho Counties, Tex., where it is rare (*Ibid.*, Vol. IV, 1887, p. 292).

It occurs north, at least to northwestern Dakota, where it breeds.

565. **Spizella atrigularis** (Cab.). [215.] *Black-chinned Sparrow.*

A Mexican species, coming north to the valley of the Upper Rio Grande, in Texas.

566. **Junco aikeni** Ridgw. [216.] *White-winged Junco.*

This large Junco breeds in the Rocky Mountains, in Colorado, and Wyoming, and in the Black Hills of western Dakota. In winter it sometimes straggles east as far as middle Kansas and Indian Territory. In the winter of 1883–'84 it was found again by Dr. Watson at Ellis, Kans., so that it may be considered a regular visitant to the plains in Kansas.

567. **Junco hyemalis** (Linn.). [217.] *Junco; Slate-colored Snowbird.*

Breeds from northern Minnesota northward, and winters throughout the middle belt of the Mississippi Valley. A most abundant and well-known bird, concerning which so many records were received that its movements can be traced with some degree of accuracy. In the spring of 1884 but four notes of its wintering were received from the region north of latitude 41°. They are as follows: From Morning Sun, Iowa, "seen last winter;" from Coralville, Iowa, "was here last winter;" from Waukon, Iowa, "arrived October 15, a few remained all winter;" and from Heron Lake, Minn., "a very few were seen all winter." In fact, it was not common at any place north of latitude 41°, and was not abundant north of latitude 40°. This must be accounted for by the unusual severity of the winter, as the ordinary winter limit of the species is from latitude 42° to latitude 43°, and one hardy individual has been known to pass the winter in northern Minnesota at latitude 47°. Latitude 39° is just within the true winter home of the Junco. The great bulk of the species in the winter of 1883–'84 remained between latitude 39° and latitude 36°, being in that section the most numerous winter resident. They were hardly noticed by any of the Southern observers. At Caddo, Ind. Ter., they were most conspicuous by their absence; not a dozen a day were seen in town, and less than thirty in the timber.

Of their spring movements there were but few irregular notes, from which it may be inferred that the migration was quite regular and that the species is an easily noticed bird. The record from Iowa and Minnesota is as follows: March 14 the first one was seen at Ferry, Iowa; March 16 at Laporte City, Iowa; March 22 at Mitchell, Iowa; March 24 at Lanesboro, Pine Bend, and Elk River, Minn. At Minneapolis the first was noted March 27, but as the arrival of the bulk was recorded the next day, it is evident that the first came some days sooner, probably March 24. East of the Mississippi, arrivals were noted March 24 at Lake Mills, Wis., and at West De Pere, Wis., so that this must have been a great day for the migration of Juncos as it was for many other species. Additional records from the region east of the Mississippi show that it reached Chicago March 20 and Milwaukee March 22. In Dakota, arrivals were reported at Argusville and Larimore March 27; and at Two Rivers, Manitoba, April 15.

The bulk was not very far behind the van, traversing Iowa about March 25, and arriving in Minnesota up to latitude 45° on the 27th and 28th, while April 20 the main flocks reached Portage la Prairie, Manitoba, latitude 50°. In northeastern Iowa and southeastern Minnesota, they were most numerous April 10. On the same day they were marked "innumerable" at Waukon, and at Lanesboro "numerous beyond all reckoning." The record of the departure of the bulk was more regular and extended than that of its arrival. It is as follows: Texas, latitude 33° 36′, March 13; Indian Territory, latitude 34° 11′, March 10; Indian Territory, latitude 35° 37′, March 20; Missouri, latitude 38° 40′, March 27; Missouri, latitude 38° 45′, March 31; Kansas, latitude 39° 12′, April 1; Iowa, latitude 42° 18′, April 10; Iowa, latitude 43° 15′, April 17; Dakota, latitude 42° 56′, April 21; Minnesota, latitude 43° 43′, April 21; Minnesota, latitude 43° 48′, April 20; Minnesota, latitude 45° 25′, April 28. The records from latitude 42° 56′, in Dakota, and 43° 48′, in Minnesota, were a little later than the others from the same latitude because these stations are farther west. All the irregular notes were made April 16, and came from latitude 36° 56′, in Missouri, and latitude 41° 36′ and 42° 01′, in Iowa. The records of the "last one seen" are also quite regular, and will be given in full. The last Junco seen at latitude 33° 36′, in Texas, was April 23; at latitude 38° 40′ and 38° 45′, in Missouri, April 24; at latitude 39° 19′, in Illinois, April 23; at latitude 40° 50′, in Iowa, April 25; latitude 41° 51′, in Illinois, April 30; latitude 42° 18′, in Iowa, April 24; latitude 43° 15′, in Iowa, April 30; latitude 43° 43′, in Minnesota, April 30; latitude 44° 32′, in Minnesota, May 1; latitude 44° 45′, in Wisconsin, May 4. The irregular dates of departure are: Latitude 34° 11′, in Indian Territory, March 26; latitude 39° 12′, in Kansas, April 13; latitude 42° 56′, in Dakota, May 3; and latitude 42° 16′, in Illinois, April 12. The total number of notes sent in on this species was ninety-eight. The average time given from the arrival of the first to the arrival of the bulk was seven days, and from the departure of the bulk to the date of the last one seen, seventeen days. Mr. J. A. Balmer sent the following notes from Danville, Ill. (latitude 40° 08′):

> Many large flocks wintered here, but the bulk left by the 1st of May. On June 1 I noticed a male bird; June 7, both male and female; and again, on June 21, I saw a male bird, always near the same spot. This led me to think the pair might be nesting here. I have searched pretty thoroughly for their nest, but without success.

In the fall of 1884 the first Junco appeared at Elk River, Minn., September 24, and the bulk arrived October 1. The bulk departed November 1, and the last four days later. None were reported from Hastings, Minn., until November 25. At Des Moines, Iowa, the first was reported October 18, the bulk arriving October 22. At Mount Carmel, Mo., the first appeared October 13, and the bulk arrived November 1. The first came to Gainesville, Tex., October 22. Mr. Lloyd states that it is common in winter in Tom Green and Concho Counties, Tex., and Mr. Nehrling recorded it as an abundant winter resident in southeastern Texas.

In the spring of 1885, instead of ninety-eight notes (the number contributed in 1884) but thirty-six were received. The most northern stations which recorded Juncos during the winter of 1884–85, were Leeds Centre, Wis., and Lanesboro, Minn. They appeared at Laporte City, Iowa, and Waukon, Iowa, the middle of March. The last four days of March and the first three days of April they were reported from Chicago, Ill.; Clinton, Wis.; Milwaukee, Wis.; Durand, Wis.; New Richmond, Wis.; Hastings, Minn.; Minneapolis, Minn.; Elk River, Minn.; Argusville, Dak.; and Oak Point, Manitoba. An immense movement must have occurred during these seven days. Other stations in Manitoba recorded their arrival April 7 and April 8. The whole record from Saint Louis is as follows: "During the coldest weather our Slate colored Snowbirds scatter over the farm-yards, but as soon as the weather moderates they flock together and then their numbers can be judged. It was difficult to say whether or not the total number was much smaller than usual in the winter of 1884–'85. At several stands not 50 per cent. were to be found during the last days of February, while at others they seemed as numerous as ever. April 1, there were great numbers present, excited old birds singing and chasing one another; April 2, a decrease; April 6, bulk departed; April 7, several small flocks present, very light-colored birds; April 17, small flocks; April 19, last." From other stations the records of "lasts" were somewhat irregular. At Pierce City, Mo., the last was seen May 3 (the position of this station, near the Ozark Mountains, probably explains the lateness of the date of departure); at Mount Carmel, Mo., the last one was seen April 11; Manhattan, Kans., April 5; Chicago, Ill., April 21; Des Moines, Iowa, April 21; Waukon, Iowa, April 24; Leeds Centre, Wis., April 21; Durand, Wis., April 23; New Richmond, Wis., April 29; Lanesboro, Minn., April 30; Lake City, Minn., April 27; and Elk River, Minn., May 6.

In the fall of 1885 the arrival of the first at Elk River, Minn., was recorded September 23; New Richmond, Wis., September 25; Lanesboro, Minn., September 27; Milwaukee, Wis., October 3; Grinnell, Iowa, October 4; Iowa City, Iowa, October 3; Des Moines, Iowa, October 3; Saint Louis, Mo., October 10; Mount Carmel, Mo., October 16; and Bonham, Tex., October 30. At Gainesville, Tex., they were seen for the second time November 7; a straggler had previously been seen early in October. At Elk River, Minn., and Milwaukee, Wis., none were seen after November 12. The bulk arrived at Saint Louis, Mo., October 21, and were still numerous there November 11.

567 a. Junco hyemalis oregonus (Towns.). [218.] *Oregon Junco.*

All the notes on this species came from the West. The regular home of this Junco is northwest of our district, but in migration a few come east far enough to encounter our observers. It occurs in western Manitoba, and from Kansas southward it is a winter resident. It was found at San Angelo, Tex., in company with the White-crowned Sparrow. At Gainesville, Tex., in 1884, it was seen March 5, but left soon after. At Caddo, Ind. Ter., it came January 1, and remained through February; while at Manhattan, Kans., it came October 27, 1883, with *Junco hyemalis*, and remained a few days later than that species, the latter leaving April 22.

The Oregon Junco was common at Manhattan, Kans., throughout the winter of 1884–'85, and the last departed March 14, 1885. It has been found accidentally at Chicago and in Michigan.

569. Junco caniceps (Woodh.). [220.] *Gray-headed Junco.*

The home of this Junco is in the Rocky Mountain region. It has been recorded from Texas (Woodhouse); the Black Hills (Coues); and Michigan (Atkins).

570 a. Junco cinereus dorsalis Henry. [221.] *Red-backed Junco.*

Mr. Lloyd has brought this southwestern Junco within our district by finding it a winter resident at Fort Davis, Tex., at an altitude of nearly 5,000 feet.

573. Amphispiza bilineata (Cass.). [224.] *Black-throated Sparrow.*

An inhabitant of the Southwestern States and northern Mexico, reaching its eastern limit in the valley of the Lower Rio Grande, in Texas, where it is common (Merrill; Sennett). It was found as a rare winter resident at Mason, Tex., and as a common resident at San Angelo, Tex., where four nests were found during the last week of May in the skirts of dense chaparral along the edges of ravines. The finding of a nest with fresh eggs July 13 indicates that the bird raises two broods. Mr. Lloyd states that "this species has extended east within the last six years to the Colorado River."

574 a. Amphispiza belli nevadensis (Ridgw.). [225*a*.] *Sage Sparrow.*

Another Western Sparrow. On the eastern slopes of the mountains in western Texas, at an elevation of about 5,000 feet, is the Government post, Fort Davis. Here are found the Red-naped Woodpecker, the Common Phœbe, the Townsend's Solitaire, the Swamp Sparrow, the Arizona Stephens Vireo, and Marsh Wrens, which agree exactly with the Pacific coast form; and here, during the winter of 1885–'86, Mr. Lloyd found the Sage Sparrow.

575a. Peucæa æstivalis bachmanii (Aud.). [226*a.*] *Bachman's Sparrow.*

Bachman's Sparrow is a bird of the Southeastern States, reaching its western limit in Texas. Although it is rather a common species along the southern course of the Mississippi, up to southern Indiana and southern Illinois, it was noted by but few of the observers. It was found at Pierce City, Mo., as a not common breeder; and at Gainesville, Tex., as a very rare species. At Gainesville, in 1876, the first came April 10; but in 1884 the first was not noted, and only two specimens were shot. Mr. Lloyd gives it as a breeder in eastern Concho County, Tex.

577. Peucæa mexicana (Lawr.). [——] *Mexican Sparrow.*

Breeds in the valley of the Lower Rio Grande, in Texas, and thence southward and westward. Dr. J. C. Merrill, U. S. Army, found it "in some abundance on a salt prairie about 9 miles from Fort Brown, Tex.," where he took a nest containing four fresh eggs, June 16, 1877.*

578. Peucæa cassini (Woodh.). [228.] *Cassin's Sparrow.*

In our district this species ranges as a summer resident from southeastern Texas to middle and western Kansas. In eastern Texas, near Houston, Mr. Nehrling recorded it as "a common summer resident on the open grassy prairies." Along the Lower Rio Grande, in the extreme southeastern corner of the State, both Dr. Merrill and Mr. Sennett found it breeding. Mr. Lloyd states that it is a common summer resident in Tom Green County, Tex., and is tolerably common in Concho County in fall. It was observed at Gainesville, Tex., where the first arrived May 13, and where it was marked rare.

In the spring of 1885 the first Cassin's Sparrow arrived at San Antonio, Tex., May 11.

580a. Peucæa ruficeps boucardi (Scl.). [230.] *Boucard's Sparrow.*

Occurs from central western Texas westward and southward. Mr. Ridgway has kindly shown me a specimen, in the collection of the U. S. National Museum, which was killed about the middle of May, 1878, at Colorado, Mitchell County, Tex., where it was doubtless breeding.

580b. Peucæa ruficeps eremœca Brown. [——.] *Rock Sparrow.*

Mr. Nathan Clifford Brown described this subspecies from specimens taken by him at Boerne, Tex., in the winter of 1879–'80 (Bull. Nutt. Ornith. Club, Vol. VII, 1882, pp. 38, 39). A male and female had been previously killed in Gillespie County, Tex. (April 24, 1878), by Mr. Ragsdale. They were regarded as *P. ruficeps* (*Ibid.*, Vol. III, 1878, pp. 188, 189).

581. Melospiza fasciata (Gmel.). [231.] *Song Sparrow.*

The Song Sparrow breeds in Manitoba and throughout most of the northern half of the Mississippi Valley, and was reported as a winter

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*Proc. U. S. Nat. Mus., Vol. I, 1878, p. 127. It was recorded under the name of *Peucæa arizonæ*, which Mr. Ridgway now regards as not separable from *P. mexicana*. (Manual of North American Birds, 1887, p. 594.)

resident from various points in Illinois, Missouri, eastern Kansas, Indian Territory, and Texas.

Many observers are so situated that their field-work does not take them into favorable localities for this species. Its favorite haunts in winter are the dense weeds and grass along our streams; hence it is not strange that it is so often overlooked. Our reports, therefore, are so incomplete that it is impossible to fix the bounds of its winter residence, or the extent of its breeding range. Only twenty-five observers recorded its movements in 1884.

At Caddo, Ind. Ter., it was first seen November 6, 1883. Many must have wintered south of that point, for the bulk was reported as arriving March 11, 1884. The last lingered until April 4. At Pierce City, Mo., after January 2, only single birds were seen. The bulk arrived from the south March 29. At Saint Louis, Mo., Mr. Widmann reported seeing one December 29, at Florisant. February 15 the same small numbers as last year were at old stands. March 13 an increase was observed and the first song was heard. March 17 the bulk arrived, and small parties of highly-colored birds in full song were conspicuous. Ten days later, March 27, the bulk departed. A single bird in company with *M. georgiana* was seen April 14, and again April 17.

At Manhattan, Kans., the species is a rather common winter resident; it arrived from the north October 13; was seen at intervals during the entire winter in favorable localities; the bulk arrived March 15, and the last was seen April 5. Manhattan is almost directly north of Caddo, and 350 miles distant. The bulk reached Manhattan from the south four days later than it was noted at Caddo, while in the fall migration the first was seen at the former station twenty-three days earlier than at the latter.

Apparently the bulk of Song Sparrows moves from winter quarters all at once. This movement began about March 10, reaching Caddo the following day. March 13 there was an increase at Saint Louis, and by March 15 the bulk reached Manhattan. At Saint Louis the bulk arrived by March 17. March 19 the wave of migration reached Polo, Ill., and Milwaukee, Wis. March 20 the first arrived at New Cassel, Wis. March 24 it reached Lake Mills, West De Pere, and Green Bay, Wis. The bulk seemed to arrive simultaneously with the first, or but a few hours later.

March 28 the first reached Elk River, Minn., but it was not seen at Minneapolis until April 5, when it was also seen at Hastings, Minn. On the plains, out of the line of the river woodlands, it seemed to travel more slowly.

The bulk arrived at Minneapolis April 11. On the same day the first reached Oak Point, Manitoba. April 12 the first reached Larimore, Dak. At this time the last had not departed from Saint Louis.

Of the breeding habits of this species, or of the localities in which it breeds, little was reported. It was noted as breeding at Newton, Iowa, where it arrived April 9. Perhaps the most surprising note received was that from Dr. Watson, at Ellis, Kans., who reported it as a common summer resident. It does not remain to breed at Manhattan, which is much farther east. Col. N. S. Goss enters it on his "Catalogue of Kansas Birds" as "resident in eastern Kansas; rare in summer; common during the winter in thickets and sheltered lowlands."

In the fall of 1884 the bulk of Song Sparrows left Elk River, Minn., October 8, and the last November 11. At Mount Carmel, Mo., they were first seen October 22.

The most northern record of its wintering during the cold season of 1884–'85 came from Manhattan, Kans., where a few remained.

In migration in the spring of 1885 it arrived at Saint Louis, Mo., March 5, the bulk following March 14. The first came to Fernwood, Ill., March 27, and the next day to Chicago, Ill. By April 1 they had appeared at Stoughton, Wis.; Milwaukee, Wis.; Lake Mills, Wis.; Leeds Centre, Wis.; and Waukon, Iowa. April 3 and 4 they were reported from Lanesboro, Minn.; Minneapolis, Minn.; Green Bay, Wis.; and Luck, Wis. They reached Elk River, Minn., April 8, and Oak Point, Manitoba, April 13. The bulk left Saint Louis, Mo., April 6, and the last was seen there April 12. "Lasts" were reported from Pierce City, Mo., April 1; Houma, La., April 20; Mount Carmel, Mo., May 8; Manhattan, Kans., March 25; and Des Moines, Iowa, May 2. At Fernwood, Ill., a nest with five eggs was taken June 1.

In the fall of 1885 the first returned to Saint Louis, Mo., October 6; Mount Carmel, Mo., October 8; and to Bonham, Tex., October 17. At Elk River, Minn., the last was seen October 16; at Lanesboro, Minn., November 8; and at Grinnell, Iowa, November 24. At Saint Louis they were numerous October 26, in great numbers in flocks October 27, and the bulk left October 11.

581 b. Melospiza fasciata montana Hensh. [231 *a*, part.] *Mountain Song Sparrow.*

The known habitat of this Western race is in Colorado, Utah, Nevada, and northward. Some Song Sparrows taken during the fall of 1885, by Mr. Lloyd, at Fort Davis, Tex., have been identified by Mr. Ridgway as this subspecies.

583. Melospiza lincolni (Aud.). [234.] *Lincoln's Sparrow.*

Breeds but sparingly in the United States. For a long time Racine, Wis., was the southernmost point at which it was known to nest; but recently nests have been found in northern Illinois.

From southern Illinois southward Lincoln's Sparrow may be found in winter; but the great bulk of the species winters south of latitude 36°. In Kansas it is a common migrant. In eastern Texas it is common in winter (Nehrling), as it is in the valley of the Lower Rio Grande (Merrill). At Caddo, Ind. Ter., a few were found during cold weather, and probably they were more common than they seemed; since, owing to their shyness, they are not easily observed. The advance movement at Caddo in 1884 began the second week in March, and by March 15 they were in force. April 4 they were still present in about one-third of their highest numbers. Latitude 39° 12′, in Kansas, was reached April 24; latitude 38° 40′, in Missouri, April 29; latitude 41° 36′, in Iowa, and 41° 51′, in Illinois, May 9; and West De Pere, Wis. (lat. 44° 26′), May 17. The last one left Gainesville, Tex. (lat. 33° 36′), May 14, and Saint Louis (lat. 38° 40′) May 20.

In the fall of 1884 the bulk of migrants reached Des Moines, Iowa, October 25. They left there the same day, and none were seen afterward. The first reached Gainesville, Tex., October 27.

But few records were received of its movements in the spring of 1885. The first was seen at Gainesville, Tex., March 29; at Bonham, Tex., April 3; Manhattan, Kans., April 18; Saint Louis, Mo., April 22; Des Moines, Iowa, April 25; Newton, Iowa, April 24. The last was noted at Manhattan, Kans., April 29; Saint Louis, Mo., May 13; and Des Moines, Iowa, May 12. One was seen at Bonham, Tex., as late as May 20.

In the fall of 1885 they returned to Lanesboro, Minn., September 18, where many were present October 2; and they left October 6.

At Des Moines, Iowa, the last was seen October 10. The first came to Saint Louis, Mo., October 7; the bulk arrived there October 11, and the last was seen October 27. The bulk appeared at Gainesville, Tex., October 31.

584. Melospiza georgiana (Lath.). [233.] *Swamp Sparrow.*

This Sparrow is found throughout Manitoba and the whole of the Mississippi Valley. It breeds from northern Illinois far into British America, and winters from Kansas and southern Illinois southward. It is common near the Mississippi River, but rather rare on the Western plains. The most western records received from our observers were from San Angelo, Tex., where it was common in the spring of 1884, and at Ellis, Kans., where it was a rare transient. Mr. Nehrling gave it as a rare winter resident at Pierce City, Mo., but says it is more abundant in the valleys a little distance away. A single bird or two are usually found during the winter at Saint Louis, but none were seen there in 1884 until February 19. In the latter part of March the numbers at Saint Louis began to increase, but no migratory advance was made by the Swamp Sparrow until April 1. On April 3 many came to Burlington, Iowa, and the species reached the center of the State about the middle of the month. April 26 and April 27 it was reported from Waukon, Iowa, and Lanesboro, Minn. The most northern record was from Oak Point, Manitoba. Here the first was noted April 24, but, though the species goes as far north as this, there must be some mistake about the date, for the ice did not leave the lakes till five weeks afterward. The bulk arrived at Lanesboro, Minn., April 27; and the same day it left Saint Louis, where the last was seen May 10.

In the fall of 1884 the first Swamp Sparrow arrived at Elk River, Minn., September 7, and the bulk five days later. The bulk did not leave until October 3, and the last was seen October 12. At Mount Carmel, Mo., the first and last were reported together October 7.

In the spring of 1885 the first came to Saint Louis, Mo., March 14; Fayette, Mo., March 16; Newton, Iowa, March 28; and Heron Lake, Minn., March 29. All of these records are those of a very few birds that scattered over Missouri and Iowa in March. The bulk of the species did not follow for nearly a month. April 17 was the height of the season at Saint Louis, and the bulk left there April 20. On this same day they became common at Newton, Iowa; Waukon, Iowa; Lanesboro, Minn.; and the first arrived at Elk River, Minn. None were seen at Mount Carmel, Mo., after May 2, but as late as May 14 one was seen at Saint Louis, Mo.

In the fall of 1885 the first was seen at Mount Carmel, Mo., September 27, but no more were seen until October 6. At Saint Louis, Mo., they appeared October 5, and at Emporia, Kans., October 2. "Lasts" were reported from Elk River, Minn., October 15; Lanesboro, Minn., October 7; and from Des Moines, Iowa, October 29, at which date about fifty were seen. Great numbers were present at Saint Louis, October 27, and the bulk departed November 11.

585. Passerella iliaca (Merrem.). [235.] *Fox Sparrow.*

Breeds north of our northern boundary and winters in the Southern States, usually as far north as eastern Kansas. Few birds migrate more rapidly than the Fox Sparrow, and it is not uncommon for the first, the bulk, and the last to be noted during the same week. In the spring of 1884 migration was much more prolonged than usual. The cold wave of January 1 sent the species into more than ordinarily southern winter quarters. At Manhattan, Kans., it is usually a common winter resident. In the winter of 1883–'84 it was abundant until New Year's, but disappeared then until March. Only one bird was seen at Saint Louis during the winter; and at Pierce City, Mo., though many had remained the winter before, none were seen after December. South of latitude 37° it was an abundant winter resident. The first slight movement took place in the latter part of February, bringing a few more individuals to Caddo, Ind. Ter., the bulk to Saint Louis, and the first to Carlinville, Ill., but no real migration occurred until about the middle of March. Leaving out of account irregular notes, the regular movements appear to have been as follows: March 15 the species arrived at Manhattan, Kans., and Danville, Ill.; March 16 at Osceola, Ill.; and March 19 at Iowa City, Iowa. Then no movement was reported until March 27 and March 28, when it appeared over the rest of Iowa and over Minnesota up to Elk River. In Wisconsin it appeared along the forty-fifth parallel about April 1, and at Portage la Prairie, Manitoba, April 22. The bulk came to Gainesville, Tex., Caddo, Ind. Ter., and Pierce City, Mo., March 17; Mount Carmel, Mo., March 19; Iowa City, Iowa, March 20; and Lanesboro, Minn., March

29. The bulk left Mount Carmel and Saint Louis, Mo., March 26, and Lanesboro, Minn., April 21. The last left Gainesville, Tex., and Caddo, Ind. Ter., about April 1. From Manhattan, Kans., and Saint Louis, Mo., they departed April 4 and 6, though at Saint Louis a stray one was seen April 17 in company with Hermit Thrushes. At Des Moines and Waukon, Iowa, the last was marked April 20; at Milwaukee, Wis., the day before; at Lanesboro, Minn., April 26, and at Elk River, April 28.

In the fall of 1884 the first and last Fox Sparrow was seen at Elk River, Minn., October 6. The first came to Des Moines, Iowa, October 9, the bulk October 25, and the last was seen there October 27. At Mount Carmel, Mo., the first was seen November 3, and the last November 8.

During the winter of 1884–'85 no Fox Sparrows remained at either Manhattan, Kans., or Saint Louis, Mo.

In the spring of 1885 one flock was found in the lowlands of Illinois, opposite Saint Louis, March 5. March 14 the first was seen on the Missouri side of the river, and the same day the first one returned to Manhattan. At Fayette, Mo., about twenty were seen March 15; and a pair were observed March 24 at Paris, Ill. During the first six days of April they were noted from Des Moines, Iowa; Coralville, Iowa; Grinnell, Iowa; Newton, Iowa; Waukon, Iowa; Hennepin, Ill.; Rockford, Ill.; Leeds Centre, Wis.; Durand, Wis.; Lanesboro, Minn.; and Elk River, Minn.

The records of "lasts" were irregular, and ranged between April 12 for Saint Louis and Mount Carmel, and April 23 for Durand and Elk River.

The fall notes on the Fox Sparrow, in 1885, were more irregular than those relating to any other species. Fox Sparrows were noted at about the same time (the first week in October) at various stations from latitude 45° 25′, in Minnesota, to Central Missouri. At Elk River, Minn., the last was seen October 18, and at Grinnell, Iowa, October 27, at which latter date they were very numerous in flocks at Saint Louis. The bulk left Saint Louis November 11. The last was seen at Mount Carmel November 14, and the first reached Gainesville, Tex., November 15. Mr. Ernest E. Thompson has recorded this species as breeding abundantly at Duck Mountain, Manitoba.

585 c. **Passerella iliaca schistacea** (Baird). [235 *c.*] *Slate-colored Sparrow.*

The Rocky Mountain representative of the foregoing. In migration it comes east to the plains, and has been taken in Kansas.

586. **Embernagra rufivirgata** Lawr. [236.] *Texas Sparrow.*

The home of this Sparrow is in the Lower Rio Grande Valley, in Texas, where it is common (Merrill and Sennett).

587. **Pipilo erythrophthalmus** (Linn.). [237.] *Chewink; Towhee.*

Breeds in the middle and northern portions of the Mississippi Valley and Manitoba; winters in the Southern States; a few breed in southeastern Texas (Nehrling). In eastern Kansas it is a common resident.

Reports upon its movements in 1884 were received from but forty observers. None of these came from the region of the Lower Mississippi. Indeed, but three of them were from stations south of the thirty-seventh parallel; the result is that little has been added to our knowledge of the winter habits of this well-known bird.

In Texas the Chewink seems to range farther west than in Kansas and Nebraska. At San Angelo, Tex., it was seen several times during the winter, and two were shot in January, 1884. At Gainesville, Tex., it was a common winter resident, remaining until April 24, when the last was heard. At Caddo, Ind. Ter., it was abundant as early as November 29, 1883, and most of the birds were in pairs. On March 8 they began to spread out from winter quarters. In southern Kansas and Missouri they frequently remained during the winter. At Pierce City, Mo., none were seen in 1884 later than the last of December, although the preceding winter they were abundant. At Saint Louis, Mr. Widmann reported two pairs as remaining all winter in company with Cardinals. At Manhattan, Kans., none were seen later in the fall than the latter part of November; but the preceding year they remained until the extreme cold of the middle of January drove them out. In 1884 the first arrival in migration was reported at Saint Louis, February 24; but the movement did not appear to be general. The arrivals consisted of a few males and females. March 11 a stray migrant appeared at Chicago, Ill., and on the following day the regular advance came to Hillsboro and Carlinville, in the same State. March 15 they were reported at Danville, Ill., and Manhattan, Kans.; March 22 at Burlington, Iowa; March 23 at Iowa City, Iowa; March 27 and March 28 at Laporte City, Iowa, at Polo, Ill., and Des Moines, Iowa. Along Lake Michigan they seem to have been a little earlier, arriving at New Cassel and Milwaukee March 24 and March 26. In this species, migration along the Mississippi River seems to have been more retarded than along the eastern border of the district or along the border of the plains in Kansas, which is contrary to the rule among most species. How far the food supply and the condition of the weather influenced these movements can only be determined by the most careful observation. April 4 the first was seen at Lake Mills, Wis.; April 10 at Waukon, Iowa; April 18 at Lanesboro, Minn.; April 24 at Lake City, Minn.; April 26 at Waupaca, Wis.; April 27 at Green Bay, Wis.; April 30 at Elk River, Minn.; and May 17 at Frazee City, Minn. At Manhattan, Kans., the bulk arrived March 19; at Hillsboro, Ill., April 8; at Polo, Ill., April 15; at Iowa City, Iowa, April 19; at Lake Mills, Wis., April 28; at Milwaukee May 3; at West De Pere, Wis., May 16; at Frazee City, Minn., May 20; at Vermillion, Dak., May 8; at the latter place the species was most abundant June 12.

From Mr. Widmann, at Saint Louis, the following full report was received:

February 24, first arrival; March 13, first song-birds still scarce; March 17, arrival of bulk; March 23, many, noisy, conspicuous; March 31, transients in parties of six to eight; April 1, summer residents carrying building material; April 4, last transient; April 17 to 19, singing, fighting, love making; May 24, first young out of nest.

At Manhattan, Kans., two broods are reared in a season; the first young are hatched early in May; the nests are almost invariably built upon the ground; the second brood is hatched in June, and the nests are almost uniformly built in bushes from 2 to 7 feet from the ground.

In the fall of 1884 the last Chewink was seen at Des Moines, Iowa, August 29; the bulk left Mount Carmel, Mo., October 20, and the last October 27; at San Angelo, Tex., the first came September 29, and by October 9 they were common.

In the spring of 1885 there was almost a double set of notes for this species. The second record, in at least half the cases, was a week or more later than the first, instead of a day or two later, as is the rule with most birds. At Saint Louis, Mo., the first came March 10, and the bulk of males on the 14th; and on this latter date the first one was seen at Shawneetown, Ill. Two days before this the second was seen at Odin, Ill., the first having come long before. The first reached Paris, Ill., March 27, the day before it was noted at Manhattan, Kans. Then there was a double movement. The first wave (from April 1 to April 6) brought large numbers of Chewinks to southern Iowa, and a sprinkling to various points in northern Illinois. The second occurred after an interval of two weeks, and brought a second set of "firsts" to Iowa and Illinois on April 20, April 21, and April 22, and passed on to latitude 45°, in Wisconsin and Minnesota. After another pause, Elk River, Minn., was reached May 6; Menoken, Dak., May 12; White Earth, Minn., May 16 (many were seen), and Oak Point, Manitoba, May 18. The last left Bonham, Tex., April 14, and Gainesville, Tex., May 12.

In the fall of 1885 the last Chewink was reported from Elk River, Minn., September 29; from Lanesboro, Minn., November 8; Grinnell, Iowa, October 17; Iowa City, Iowa, October 17; and Des Moines, Iowa, October 7. At Saint Louis, Mo., Chewinks were common in large flocks September 23; the bulk arrived October 5; they were most numerous from October 6 to October 12; the bulk departed October 20, and the last transient was seen November 11. At Mount Carmel, Mo., the last was seen December 16. The first migrant reached Bonham, Tex., November 11, and they became common November 16.

588. Pipilo maculatus arcticus (Swains.). [238.] *Arctic Towhee.*

In our district this Towhee occurs in Texas, Indian Territory, Kansas, Nebraska, and Dakota. In winter it is found from western Kansas southward. Mr. Lloyd states that it is a tolerably common winter resident in Tom Green and Concho Counties, Tex. At Ellis, Kans., in 1884, the first was seen April 27. At Manhattan it was probably heard March 15; the first was seen March 19; the bulk came April 26; the species was still abundant May 3; the bulk left May 10; and the last was seen May 12.

In the spring of 1885 the first Arctic Towhee was seen at Manhattan, Kans., February 25; the second March 7, and was common April 26.

In migration, at Manhattan, Kans., the Arctic Towhee is much more abundant than the eastern species. In the autumn they linger until late in the winter, sometimes remaining with *erythrophthalmus* during the entire winter. In the spring they arrive in large numbers after *erythrophthalmus*, and remain about two weeks.

590. Pipilo chlorurus (Towns.). [239.] *Green-tailed Towhee.*

The home of this species is in the interior plateau region of the United States, from the western border of the plains to the Sierra Nevada, from about latitude 40° south into Mexico. Several years ago it was taken in southwestern Texas, and February 25, 1885, Mr. Harry Attwater took a specimen at San Antonio, Tex. Mr. Lloyd has recently published the following in regard to its occurrence in Texas:

> The bird must be spreading east, as I see it as far east as the head draws of the Middle Concho. Common on the east side of Pecos River. Probably breeds.

591. Pipilo fuscus mesoleucus (Baird). [240.] *Cañon Towhee.*

This Towhee occurs as far north as Colorado, but enters our district in Texas only, where Mr. Lloyd found it a tolerably common resident in Tom Green County.

593. Cardinalis cardinalis (Linn.). [242.] *Cardinal.*

The Cardinal inhabits all of the Mississippi Valley east of the plains and south of southern Nebraska and southern Iowa, and has been found occasionally in Minnesota. South of latitude 41° it is stationary, while north of this parallel some remain in the winter, but most go south. Dr. Watson gave it as rare at Ellis, Kans., but Mr. Lloyd found it common at San Angelo, Tex. Mr. Widmann said of its winter habits at Saint Louis: "It is here one of the most numerous of the winter birds, occurring in pairs, family groups, and flocks, and remaining at or near the breeding grounds all winter. In hard times corn is the chief attraction." At Caddo, Ind. Ter., its habits were somewhat different. During the fall, Cardinals were found among the thick, tall weed patches around the cotton fields; they were silent and so shy that they were seldom seen, sheltering themselves in the almost impenetrable mass of foliage. During the latter part of November, when most of the leaves had fallen, they retreated to the thickets along the stream. Here they staid in great numbers until real winter, when they began to flock into town, and as long as snow lasted they could be found everywhere around the houses where not one had been seen for several months. A warm period would find them back in the thickets, only to return with the next cold snap. The most northern record received was from Iowa City, Iowa, where one was seen April 17, but it may have been an escaped cage-bird.

In the spring of 1885 two Cardinals were seen in January at Morning Sun, Iowa, but they were not recorded during the winter of 1884–'85 from any other place in Iowa. They returned to Ferry, Iowa, March 29, and to Denmark, Iowa, April 19. A set of six eggs was taken at Peoria, Ill., May 7.

In the fall of 1885 a Cardinal was taken at Iowa City, Iowa, October 29, being the first one captured in that county that was certainly a wild bird. At Saint Louis, Mo., large flocks of these birds were present September 23. They were most numerous October 6, and decreased October 20.

594. **Pyrrhuloxia sinuata** Bonap. [243.] *Texas Cardinal.*

The Texas Cardinal is a southern species resident wherever found. In 1884 it was noted at San Antonio and Eagle Pass, Tex., and its range extends thence south and west. It is especially abundant from Eagle Pass southward. At Boerne, Tex., Mr. Brown secured a pair in 1883—the female February 2, and the male April 5.

In the spring of 1885 a male was taken at San Angelo, Tex., April 26. This I believe to be its most northern record.

Pyrrhuloxia sinuata beckhami Ridgw. [—.] *Arizona Pyrrhuloxia.*

The type of this newly described subspecies was taken at El Paso, Tex., by Lieut. J. G. Parks, U. S. A. (Auk, Vol. IV, No. 4, October, 1887, p. 347). It has been found also in southern Arizona and New Mexico.

595. **Habia ludoviciana** (Linn.). [244.] *Rose-breasted Grosbeak.*

Breeds from about latitude 37° northward; tolerably common in Manitoba. The spring migration of this species is evidently carried on in a northeasterly direction. It is found in Mexico and Central America during the winter; but during the summer it is entirely a bird of the eastern province, rarely breeding as far west as eastern Kansas (where it is common during migration). Mr. Ragsdale has never seen it at Gainesville, in north-central Texas, and Professor Nehrling does not mention it in his Birds of Southeastern Texas.

The southernmost station reporting the Rose-breasted Grosbeak in 1884 was Saint Louis, Mo., where the first male was noted April 26, followed two days later by the bulk of the males. April 29 and 30 they appeared in Illinois up to latitude 39° 43′, with an accidental one at Waukon, Iowa (lat. 43° 15′); and the first two days of May found them in Illinois north to latitude 40° 08′, and to latitude 41° 40′, in Iowa. The advance was quite regular over northern Illinois, Wisconsin, and Minnesota, bringing the van of males to latitude 44° 22′, in Wisconsin, and 44° 32′, in Minnesota, May 8. By May 10 they had reached Elk River, Minn. (lat. 45° 25′), and May 28 they were noted at Portage la Prairie, Manitoba (lat. 50°), which is nearly as far north as the species occurs. The average of the data received from seven stations indicates that the arrival of the first female was about five days later than that of the first male, while the arrival of the general bulk of the species was about one day later. In the south the difference in the times of arrival of males, females, and bulk was greater than in the north, the indications being that in approaching the northern limits of its range the females traveled with the bulk, and were only two or three days behind the van.

In the fall of 1884, at Des Moines, Iowa, the last Rose-breasted Grosbeak was reported August 29.

In the spring of 1885, as usual, the record of the first at Saint Louis was considerably earlier than from corresponding stations farther east or west. It was seen there April 20; at Mount Carmel, Mo., April 25, and at Paris, Ill., April 30. This last date is probably a little late, since on the two preceding days it had been noticed at Peoria, Griggsville, and Aledo, Ill., and also at Des Moines and Keokuk, Iowa. A second wave passed over this same part of Iowa May 1. A few scattering individuals were noted May 6 and May 7 at Lanesboro, Minn., Elk River, Minn., and La Crosse, Wis. These were followed, May 11 and May 12, by a heavier advance, which reached Heron Lake, Rochester, Lake City, Hastings, and Elk River ("common"), in Minnesota, and Ripon and Durand, in Wisconsin. The first in Manitoba was noted at Shell River, May 16. In Kansas and Nebraska, where this bird is rarely found, the movement was much delayed, and at Manhattan, Kans., and Unadilla, Nebr., the first was not recorded until May 16.

In the fall of 1885 the only regular notes on this species came from Saint Louis, where it was common September 16, very numerous September 22, bulk present September 25, and bulk departed September 29. At the regular stands the last was seen October 6, and none were seen after October 11. The notes from other stations were very irregular. The last was reported from Elk River, Minn., September 9, and from Grinnell, Iowa, August 9.

596. **Habia melanocephala** (Swains.). [245.] *Black-headed Grosbeak.*

The summer range of this Grosbeak extends from the plains westward; it winters in Mexico. During the spring migration it enters Arizona and New Mexico in April. The majority pass north in the Rocky Mountain region, but some move northeastward over the plains and are found in the valley of the Rio Grande, in western Kansas, in Nebraska, and in Dakota. In western Kansas it is not uncommon in summer. Professor Lantz and Dr. Blackly have shot it at Manhattan, Kans., and July 11, 1884, Colonel Goss saw a male as far east as Topeka, Kans. Mr. Powell has taken it at Alda, in southeastern Nebraska, and Dr. Agersborg in southeastern Dakota. It has occurred accidentally in Michigan. The most eastern record in Texas was from Mason, where a single male was secured by the Rev. I. B. Henry. It was reported also from Colorado City, near the one hundredth meridian, and from San Saba County (long. 98°), where Mr. Ragsdale took one in 1879. Mr. Lloyd states that it is a rare summer visitor in Concho County, Tex.

In the spring of 1885 the first Black-headed Grosbeak was seen at Mason, Tex., May 4, and at Emporia, Kans., May 10.

597. Guiraca cærulea (Linn.). [246.] *Blue Grosbeak.*

The Blue Grosbeak is a southern species. Both it and the Black-headed winter in Mexico, but while in spring the bulk of the latter migrate north to Colorado and Utah, the present species moves a short distance north and a long distance east, sometimes even to New England. In middle and western Kansas it is a common summer resident. In its migration it reaches southern Illinois and southern Nebraska. In the spring of 1884 it arrived at Gainesville, Tex., April 25; at Pierce City, Mo., May 9, and was very common. At Manhattan, Kans., the first was seen May 10, but it was not common until the last of the month. It was seen at Ellis, Kans., May 13; at Lawrence, Kans., July 5, 1884. Col. N. S. Goss saw a pair of Blue Grosbeaks followed by three fledged young.

In the spring of 1885 the records of the migration of the Blue Grosbeak were unaccountably irregular. They are as follows: The first was seen at San Antonio, Tex., May 6; at Mason, Tex., April 20; at Gainesville, Tex., April 18; at Pierce City, Mo., May 9; at Emporia, Kans., May 12; and at Manhattan, Kans., May 2. At Manhattan they had become common by May 12. In Texas it is a “tolerably common migrant in fall from the Pecos River to the Colorado River; breeds abundantly farther west” (Lloyd). In southeastern Texas it is a “regularly distributed summer resident, but nowhere abundant” (Nehrling).

598. Passerina cyanea (Linn.). [248.] *Indigo Bunting; Indigo Bird.*

The Indigo Bird is found all over the Mississippi Valley, east of the plains. Elk River, Minn., is very near the northern limit of its range; north of this it only occurs locally (in three years' residence at latitude 47°, in Minnesota, it was not seen). It usually leaves the United States in winter Mr. Bibbins says he has seen it as an occasional winter visitant at Mermenton, La. In the spring of 1884 it had advanced up the valley to Pierce City and Saint Louis, Mo., by April 29. May 3 it was seen at Carlinville, Ill., and two days later at Glasgow, Mo., while on the same day it was noted at Manhattan, Kans. Its presence is thus very accurately fixed at this date, but for the next two weeks the records were so at variance that it is probably the nearest approximation to say that on May 10 the normal van was in northern Illinois and northern Iowa. May 15 it was reported in Minnesota from Lake City and Pine Bend; May 23 from Minneapolis, but not until June 2 from Elk River. It may not be out of place here to give Mr. Widmann's full record from Saint Louis, as showing how many changes take place in the individuals present at different times. His record reads:

> April 28, first, a male in song; April 29, an increase, a small flock of males; April 30, males in song in a few places; May 5, the bulk of the males and the first female arrived; May 6, males everywhere in noisy flocks and many transients. These two days (May 5 and 6) were the height of the season for males. May 9, the bulk of young males and the bulk of females arrived; birds mating; May 21, nest building; May 31, they were one of our most industrious songsters.

In the fall of 1884 the bulk of Indigo Buntings left Williamstown, Iowa, August 19, and the last August 28. At Mount Carmel, Mo., the last was noted August 29. Mr. Lloyd says that it is a rare fall migrant in Tom Green County, Tex.; and Mr. Nehrling states that in southeastern Texas it was "observed only during the migrations."

In the spring of 1885 it was recorded from San Antonio, Tex., April 16. It reached Gainesville, Tex., April 20; Pierce City, Mo., April 21, and Saint Louis, Mo., April 23. The notes from stations east of the Mississippi River were too irregular to be satisfactorily worked up, but those west of the Mississippi indicate that the species reached latitude 42° May 10 and May 11; latitude 43° May 14; latitude 44° May 19, and latitude 45° May 21. The most northern record was from Elk River, Minn. (lat. 45° 25′), May 27.

In the fall of 1885 the last Indigo Bunting was reported from Elk River, Minn., September 7; from Grinnell, Iowa, September 28; Iowa City, Iowa, August 29; Fayette, Mo., October 1, and from Mount Carmel, Mo., August 9. At Saint Louis, Mo., they were numerous September 9; they were very common September 22; the bulk was present September 25; they had decreased by October 6; they were seen in several places October 11; the last one at their regular stands was seen October 14, and none were seen after October 17.

599. Passerina amœna (Say). [249.] *Lazuli Finch; Lazuli Bunting.*

West of our district the Indigo Bunting is replaced by the present species, which seldom enters the Mississippi Valley. Its true home is from the plains westward. It is common on the Missouri, in central Dakota, and thence westward (Allen). The only records from the observers came from Dr. Agersborg, who finds a few every summer at Vermillion, Dak., and from Dr. Watson, who found it a rare summer resident at Ellis, Kans.

600. Passerina versicolor (Bonap.). [250.] *Varied Bunting.*

The home of this remarkably colored bird is in eastern Mexico and the Lower Rio Grande Valley in Texas, where it is tolerably common (Sennett; Merrill). A straggler (or an escaped cage bird) has been taken in Michigan (Dr. H. A. Atkins).

601. Passerina ciris (Linn.). [251.] *Painted Bunting; Nonpareil.*

A southern species whose northern limit barely reaches southern Kansas and southern Illinois. In the spring of 1884 it crossed our southern border after summer was fully here, and did not go far north It arrived at Mason, Tex., April 25; at Rodney, Miss., the next day, and two days later at Gainesville, Tex. At Caddo, Ind. Ter., it was an abundant breeder. Mr. Lloyd writes that at San Angelo, Tex., the male of this species is the first summer bird to depart, the female remaining six weeks or so later. It breeds from May 2 to July 14, raising two broods. There is one record in Illinois of its occurrence near Mount Carmel. In May, 1885, Col. N. S. Goss found it breeding plentifully in Comanche County, southern Kansas (The Auk, Vol. II, 1885, p. 276).

In the fall of 1884 the last male Nonpareil was seen at San Angelo, Tex., July 29, while a female and young were seen September 6. In 1883 they were seen as late as September 14.

In the spring of 1885 the first came to Houma, La., April 1; San Angelo, Tex., April 9; Bonham, Tex., April 17; and Gainesville, Tex., April 19. The following account of the breeding habits of the Nonpareil, from the pen of Mr. H. F. Peters, of Bonham, Tex., will be interesting to Northern readers who are unacquainted with the bird:

> The Nonpareil is one of my pets, and as I have five or six pairs breeding in my yard every year I have a good opportunity to watch them. They arrive here at Bonham from the 10th to the 20th of April, the males coming some ten days or more before the females. The males spend their time playing and frolicking until the arrival of the females, when the playing turns to courting and fighting. It is both interesting and amusing to watch the male trying to attract the attention of the female. He will hop down on the ground, spread his wings and tail, strut around and cut all sorts of capers. The first time I saw it done I thought he was wounded, and started towards him to pick him up, but soon learned my mistake. They are not very quarrelsome birds, and soon commence to pair. At this period the male is very attentive, but after nest building has commenced he is quite another bird. He helps to find the place to build, and appears to be very particular about it, but as soon as it is decided upon he retires from business. He never works; he is a little dude, too finely dressed to do any labor. I have frequently seen him sitting a few feet above the nest, singing unconcernedly, while his mate would be struggling with a yard or two of twine, or a piece of old rag to weave into the nest. I have never seen the male help in nest building, or in feeding the young while in the nest, but have seen him feed the young after they were fledged. A cat caught a female when the young were unfledged, and I watched her mate to see if he would raise the young. He never fed them once. He let them die, and went off and found another mate who raised a family of young not more than 6 feet from the other nest. While the female is very gentle and tame, frequently coming to the door in search of material for the nest, and food for the young, the male is shy and keeps at a distance. When the young are full grown he troubles himself no more about them. The middle of August he leaves wife and family and goes south to his winter home. The female and young remain until the second week in October.

602. **Sporophila morelleti** (Bonap.). [252.] *Morellet's Seed-eater.*

A tropical American bird, coming north to the Lower Rio Grande Valley in Texas, where it is not uncommon (Merrill; Sennett).

604. **Spiza americana** (Gmel.). [254.] *Dickcissel; Black-throated Bunting.*

A rather southerly species, passing north to latitude 45° in the Mississippi Valley, and wintering entirely south of the United States. Mr. J. A. Allen found a few in western Dakota, near latitude 47°, in the summer of 1873. It breeds abundantly in southeastern and western Minnesota and eastern and middle Kansas. J. C. Hvoslef writes June 18, 1887, from Lanesboro, Minn., "*Spiza americana* is now one of our most common birds." In eastern Texas it breeds abundantly in all the prairie districts (Nehrling). In the spring of 1884 the first noted was seen at Gainesville, Tex., April 15. No more was heard of the species until April 26, when a single breeder and two transients came to Saint Louis. On the next day the bulk arrived at Newport, Ark., and was two days in passing from there to Saint Louis. The same day the first reached Manhattan, Kans., and the last day of the month they were noted from latitude 40° 47′ in Nebraska, and from Chicago, Ill. May 5 they were noted from latitude 41° 36′, in Iowa, and latitude 41° 58′, in Illinois, while they reached latitude 42° 01′, in Iowa, May 7. They were now nearing the northern limit of their range and the movement was slower. Not until May 24 were they seen at latitude 44° 45′ in Wisconsin; the bulk was recorded from latitude 43° 43′ in Minnesota, June 4, and from Pine Bend, Minn. (lat. 44° 47′), June 26. The full report from Saint Louis is subjoined: "April 26, the first breeder and two transients; April 28, still scarce; April 29, bulk of males arrived, many at stands and often seen on the wing going east; April 30, males noisy at stands; May 5, bulk of females arrived. This was the height of the mating season. Several parties were seen on the wing going east in the morning. May 9, young males arrived; May 20, young birds were still coming, and the species was usually seen in pairs." It breeds abundantly in southeastern Dakota.

In the fall of 1884 the last Black-throated Bunting left Des Moines, Iowa, August 29. The bulk left Mount Carmel, Mo., September 6, and the last September 20. At Unadilla, Nebr., none were seen after August 23. At San Angelo, Tex., where it is an abundant migrant, the first appeared November 6, and the last was seen November 23.

In the spring of 1885 the movements of this species differed radically from the record of them for 1884. In the spring of 1884 the first was seen at Gainesville, Tex., eleven days before any were seen at Saint Louis, Mo. In 1885 the first was reported at Saint Louis April 20, the same day that the first was seen at San Antonio, Tex., and three days before the first appeared at Gainesville. The other records of 'firsts' were: Mount Carmel, Mo., April 24, and Manhattan, Kans., April 29. Irregular and early birds were seen at Newton, Iowa, April 25, and at Hennepin, Ill., April 26. The van of the regular migration reached this section during the first five days of May, and was recorded from Odin, Ill.; Peoria, Ill.; Tampico, Ill.; Des Moines, Iowa; Grinnell, Iowa, and Unadilla, Nebr. May 11 the first was recorded from Hastings, Minn.; May 16, from Heron Lake, Minn., and during the summer from Huron, Dak., which is near the northwestern limit of its range. The whole record from Saint Louis is as follows:

> "April 20, first one in air going east; April 23, second; April 28, many going east and north; May 4 and May 5, bulk of males arrived; May 9, males numerous, females scarce; May 13, bulk of females arrived; May 14, height of the season, young birds arrived."

In the fall of 1885 none were seen at Huron, Dak., after July 7; Iowa City, Iowa, August 29; Mount Carmel, Mo., September 20, and Saint Louis, Mo., September 26.

605. Calamospiza melanocorys Stejn. [256.] *Lark Bunting.*

This is a bird of the plains, wintering abundantly in central and southern Texas, even as far east as the prairies about Houston (Nehrling), and thence southward into Mexico. The most southeastern records are the following: Mr. Nehrling found it abundant in winter about Houston, Tex. In the valley of the Lower Rio Grande, in Texas, it is a rather common winter resident (Merrill). In the winter of 1883–'84 it occurred in immense flocks at San Angelo, Tex., remaining until May 17. At Mason, Tex., a few were found in summer. Mr. Ragsdale says that it is "irregular" at Gainesville, Tex., where it was seen February 21, 1876. Passing north to middle and western Kansas, where it is an abundant summer resident, the first arrival was noted May 10. May 11 Dr. Hvoslef saw one on the high prairie 9 miles east of Lanesboro, Minn. Since Dr. Hvoslef saw a male near the same place June 19, 1883, the species probably is a semi-regular visitant to southern Minnesota. It has been found breeding abundantly in central and southeastern Dakota, and also in western Minnesota, along Traverse Lake and the Red River of the North.

In the fall of 1884, at San Angelo, Tex., the first migrant, a male, was seen October 23.

In the spring of 1885 the first returning flocks appeared at San Angelo, Tex., March 26. Birds, probably of this species, came to Bonham, Tex., April 29; they were common there May 11, and left May 24. They had previously left San Angelo, May 8, and San Antonio, Tex., May 9. At Huron, Dak., the first were seen May 13.

606. Euphonia elegantissima (Bonap.). [160.] *Blue-headed Euphonia.*

This species inhabits Central America and eastern Mexico, coming north to Texas (Giraud).

607. Piranga ludoviciana (Wils.). [162.] *Louisiana Tanager.*

This beautiful Tanager may be found in suitable localities from the Great Plains to the Pacific. In the spring of 1886 a specimen was shot on the South Concho in Texas (Lloyd). It breeds in Black Hills of Dakota.

608. Piranga erythromelas Vieill. [161.] *Scarlet Tanager.*

A common summer resident in most parts of the Mississippi Valley east of the plains, and north of latitude 37° (doubtless breeds still farther south in some places); rare as far north as Manitoba.

Few birds are better known than the gorgeous male of this species, and its record is correspondingly full. It has been taken once as far west as El Paso, Tex. In southeastern Texas, near Houston, it is a moderately common migrant (Nehrling).

In the spring of 1884 it was reported as arriving at Eagle Pass, Tex., February 29. No more records were given until April 27, when it appeared at Keokuk, Iowa, and Danville, Ill. This was several days earlier than the dates from neighboring stations; but with so striking and well-known a bird there is small chance for a mistake.

The first week in May seems to have marked its general advance to latitude 42°. A few were seen along latitude 45° May 10 and 12, but the van did not reach that latitude until May 24. One was seen May 26 at Oak Point, Manitoba, latitude 50° 30′. The only record in the West came from close to the western limit of its range: It reached Manhattan, Kans., April 30, and the bulk was present May 10.

In the fall of 1884 the bulk and last of the Scarlet Tanagers left Williamstown, Iowa, August 4. At Des Moines, Iowa, the last was seen August 1; and at Mount Carmel, Mo., September 11.

In the spring of 1885 the first note came from St. Louis, Mo., April 22. Farther west, in the same latitude, the first was seen at Mount Carmel, Mo., April 26, and at Manhattan, Kans., May 1. Latitude 41°, in western Illinois, was reached April 24, and the rest of northern Illinois, the southern edge of Wisconsin, and central Iowa on May 5 and May 6. There was no more advance until May 14 and May 15, during which days they passed to Green Bay, Wis., and Elk River, Minn.

In the fall of 1885 the last left Elk River, Minn., August 6. The last was reported at Fayette, Mo., September 1, and at Saint Louis, Mo., September 17.

610. Piranga rubra (Linn.). [164.] *Summer Redbird.*

Breeds from the middle portion of the Mississippi Valley southward. A common summer resident in eastern Kansas. Were the movements of all species as regular as those of the Redbird seem to be, the study of migration would be simple enough. Records were received from two lines of migration, and there is not an irregular record among them. From its winter home it was rather late in entering the United States, reaching Mason, Tex., April 12, and Gainesville, Tex., April 15. It was reported from Darlington, Ind. Ter., May 3; Pierce City, Mo., May 17; and May 31 it was found near its ordinary northern limit at Manhattan, Kans. Along a line of migration east of the Mississippi, it came to Rodney, Miss., April 11; Waverly, Miss., April 20; Saint Louis, Mo., April 29; and Carlinville, Ill., the next day. Such a regular record has never before been contributed, and a duplicate will seldom be found. The most western station from which it was reported is San Angelo, Tex., where it is a tolerably common breeder.

In the fall of 1884 the last Summer Redbird left San Angelo, Tex., September 19.

In the spring of 1885 no such regularity appeared in the record as was noted in 1884. The first was seen at San Angelo, Tex., April 6; Corinth, Miss., April 7; Gainesville, Tex., April 10; Shawneetown, Ill., April 19; Saint Louis, Mo., April 27; Mount Carmel, Mo., May 1, and Hennepin, Ill., May 12. The first females and young birds came to San Angelo, April 16.

611. Progne subis (Linn.). [152.] *Purple Martin.*

Breeds locally throughout Manitoba and the Mississippi Valley to the Gulf of Mexico. There is some doubt whether this bird ever spends the winter in the United States. Mr. Edwards says that he does not think it occurs in southern Louisiana in winter proper, unless perhaps during protracted periods of warm weather, which sometimes occur in December. Most other writers say decidedly that all leave the United States in cold weather. Certain it is that none remained in the Mississippi Valley in the winter of 1883–'84. They crossed our border the last week in February, but seem to have been few and scattered. The first was noted at Water Valley, Miss., March 1, and March 5 a few were seen at Gainesville, Tex., and Caddo, Ind. Ter., but no more followed for some days, and on this date they were marked at Abbeville, La., as still remaining in the same numbers as when they arrived ten days before. March 9 the first male appeared at Rodney, Miss., and was followed ten days later by the first female. By March 11, they returned to Caddo, Ind. Ter.; were seen at Newport, Ark., and also at Waverly, Miss. Still, all these were merely scouts, and it was not until March 13 and March 14 that the species become common in the Gulf States. On these days they were marked as numerous at Eagle Pass, Tex., and as arriving more plentifully at Abbeville, La., and beginning to sing a little. March 21 this regular advance moved to southern Missouri, at latitude 36° 56′ and latitude 37° 08′, and March 24 to Saint Louis. The next day it was noticed at Griggsville, Ill., and Manhattan, Kans. March 26, more came to Manhattan, and on the same date it was reported from latitude 39° 09′ and latitude 39° 14′, in Missouri, and an irregular scout moved to Tampico, Ill. (lat. 41° 36′). March 30 and April 1 a small company invaded southeastern Iowa, appearing at four stations, and April 3 some of them even reached latitude 41° 42′, in Iowa, and latitude 43° 43′, in Minnesota, but this was their last effort before the April storms drove them southward. We find no records from April 3 to April 10. On this latter date they began moving northward, being seen at places in the rear of the position of the van of April 1. About April 14 the advance was fairly under way and had proceeded northward through the rest of Iowa to latitude 43° 43′ in southern Minnesota, and through northern Illinois to latitude 43° 06′ in Wisconsin, with a scout north in Wisconsin to latitude 44° 30′. April 16 marked an advance to latitude 44° 26′, in Minnesota; April 17 to latitude 44° 32′ and latitude 45°; and April 18 to latitude 45° 25′. Then came a long pause, and it was not until after May 1 that any more movements were recorded. May 3 the species appeared at latitude 46° 33′ in Minnesota, and latitude 47° 52′ in Dakota, though it is probable that the former of these dates is later than the normal. May 19 they were seen at Portage La Prairie, Manitoba, and May 23 at Oak Point, Manitoba. Mr. Small, the observer at Oak Point, says that they were the first he ever saw there. It is probable that in the line of migration from New Orleans to Lake Winnepeg almost the entire migration took place during the following twelve nights: March 10, 20, 25, 27; April 11, 12, 13, 17; May 3, 9, 17, and 19. The distance is 1,440 miles, hence the average speed must have been 120 miles a night for every night of movement. To show how much can be learned from the study of the movements of a single species in a single locality, the full record from Saint Louis is given. Mr. Widmann had a number of Martin houses set up in his back yard, and kept a full and accurate account of all the movements which took place there. His record reads:

> March 24, at 5.45 p. m., the first birds were seen, being three scouts; March 25, at 4.45 p. m., the first of our Martins, one male; March 28, second male arrived; March 29, first transient seen passing; March 30, first female arrived and several transients went north; March 31, an increase, ten per cent. were now present; April 3 to 13 there was no increase in our colony; April 13 it increased to ten birds, the next day to sixteen, and April 16 it numbered eighteen (ten males and eight females). April 17 added one male and one female; April 18 there were nine pairs and three odd males in the boxes; April 23 about a dozen refugees from the north crowded into the boxes at night, and among them was the first male of last year in a half-starved condition; April 25 all the transient visitors were off again; our colony now numbered twenty-three birds; April 26, twenty-seven birds; April 27, twenty-eight birds; April 30, thirty birds. The bulk of the species arrived during these last five days. During the first week of May the numbers gradually increased to thirty-four birds. May 10 the last increase of old birds occurred, and now there were eighteen pairs that had taken quarters. May 11 the bulk of last year's birds were present, but did not take possession of nor sleep in the boxes. May 13 all old Martins were building earnestly, and some have been sitting on eggs since about May 9; May 20 the first pair of young birds took possession of a box and began to build; May 18 first eggs hatched; May 24 the second pair of young took a box, and June 5 the third pair did likewise.

In the fall of 1884 the last Purple Martin at Williamstown, Iowa, was seen August 19, and at Unadilla, Nebr., August 13. The bulk left Des Moines, Iowa, September 1, and the last seen was September 11. None were seen at Mount Carmel, Mo., after August 18.

In the spring of 1885 the Purple Martin did not remain long in its winter home, but returned to the United States early in February. It was seen at Houma, La., February 8, and at San Antonio, Tex., February 23. Those seen at Houma were probably irregular migrants, for no more were reported from the other stations in Louisiana until the last of the month. Those at San Antonio must have been part of the regular advance, since only two weeks later (March 6 and 7) Martins were reported from Bonham and Gainesville, Tex. During the month of March the Martins passed from latitude 30° to latitude 38°. The exact date of their movements can not be told, for in the year 1885 there was not a single observer in the country along the Mississippi River from New Orleans to Saint Louis. Here lies a vast area, 200,000 square miles in extent—larger than the whole United Kingdom of Great Britain—and yet the most thorough and painstaking search failed to discover one person sufficiently interested in the study of ornithology to make a record of the movements of birds!

The Purple Martins were reported from Emporia, Kans., March 26; Corinth, Miss., March 28, and a straggler was seen the same day at Fayette, Mo. The grand wave of migration, the largest of the whole season, passed up the Mississippi Valley during the last two days of March, and the first day of April. During these three days the arrival of Martins was noted at Pierce City, Mo.; Reeds, Mo.; St. Louis, Mo.; Glasgow, Mo.; Richmond, Kans.; Manhattan, Kans.; Shawneetown, Ill. (two observers); Paris, Ill.; Peoria, Ill.; Tampico, Ill.; Chicago, Ill.; Milwaukee, Wis.; Knoxville, Iowa; Iowa City, Iowa, and Unadilla, Nebr. A slight pause followed (on April 2 and 3), but the onward move began again April 4, and by April 5 Martins were reported from Morning Sun, Iowa; Ferry, Iowa; Des Moines, Iowa; Newton, Iowa; Laporte City, Iowa; Waukon, Iowa; Rochester, Minn.; Lake City, Minn.; Hastings, Minn.; Milwaukee, Wis.; Lake Mills, Wis.; and New Richmond, Wis. The boundaries of this movement are pretty clearly defined by the records. It was most pronounced close to the Mississippi River, where it reached the farthest north. The northern boundary of the area affected by this wave runs northwestward from latitude 43° on Lake Michigan, to latitude 45° on the Mississippi River, and then southwestward to latitude 41° on the Missouri River. New Cassel and Green Bay, in central Wisconsin, were reached April 9, but there was no record of a corresponding advance in the Missouri Valley until April 20, when Huron, Dak., was reached. At this time the Martins had passed up the Mississippi River to Minneapolis and Elk River, Minn., and on this day (April 20) three pairs appeared at Detroit, Minn. No further advance was recorded for nearly a month. Not until May 13 were any seen at Argusville, Dak. They reached Oak Point, Manitoba, May 17. No material was received from which the movements of the bulk could be learned. The full record from Saint Louis, Mo., is as follows:

March 30 the first, a male, arrived at 7.40 a. m.; at 8.14 a. m. two males passed north; 9.25 a. m. another followed, and 5.30 p. m. a party of ten passed, going north. March 31, an increase of summer sojourners; nine were seen at one time in the air; the first female arrived, and two males selected the boxes which were to be their summer homes; April 1 three pairs and one male took boxes; April 2, further increase; twelve Martins took boxes; April 7 the above number was increased to fourteen; April 14 twenty took boxes; April 15 twenty-four took boxes; April 20 thirty took boxes; April 30 thirty-seven took boxes and nest-building began; May 13, young pairs (birds one year old) began nest-building; May 15, young pairs were still increasing.

In the fall of 1885 great numbers of Martins were present at Saint Louis, Mo., August 9 in the evening; they were also numerous August 12 and 13; August 14 their numbers had decreased only to be re-inforced August 17. The bulk had gone August 26, and but few went to roost. The last great wave of the migration passed during September 8 and 9, and none were seen after September 11.

The remainder of the fall notes record the departure of the last from Fernwood, Ill., August 29; Fayette, Mo., August 25; Mount Carmel, Mo., August 9; Shawneetown, Ill., August 13; and from Bonham, Tex., August 20. It is probable that these early dates of leaving apply to the summer residents, and that the observers were so situated that they did not happen to note the last passing migrants.

612. Petrochelidon lunifrons (Say). [153.] *Cliff Swallow.*

An abundant breeder over the whole of the Mississippi Valley and Manitoba. Mr. Lloyd states that it breeds plentifully in Tom Green and Concho Counties, Tex.; and Dr. Merrill states that it is an abundant summer resident in the Lower Rio Grande Valley, in Texas, where it is the only Swallow that remains to breed. To see these Swallows in their glory, one should visit some of the great rivers of the western plains. Professor Aughey tells us that he counted in one place 2,100 nests. Leaving the United States in winter, it does not re-appear as soon as the White-bellied Swallow or the Purple Martin. In the spring of 1884 it began to return about the middle of March, and was very plentiful at Eagle Pass, Tex., March 27, whence it advanced rapidly to about latitude 40°, and then came to a halt. One was seen at Saint Louis April 15, and the species had already been noted from Burlington, Iowa, April 10. There is something singular about these records from Burlington and Saint Louis. On three species of Swallows the record at Burlington, though 150 miles farther north, was some days ahead of that at Saint Louis. The White-bellied was seen at Burlington March 10, at Saint Louis March 24; the Barn Swallow at Burlington April 10, at Saint Louis April 16; the Cliff Swallow at Burlington April 10, at Saint Louis April 15. After reaching Saint Louis and Burlington there was a pause in the movements of the Cliff Swallow until April 25, when it again started northward. By May 1 these Swallows were over all the country south of latitude 45°; May 17 they reached Portage la Prairie, Manitoba, and May 22 Oak Point, Manitoba. April 27 seems to have been a special day of migration in the West. On this day the species appeared over most of western Missouri and eastern Kansas. At Caddo, Ind. Ter., it was abundant in fall migration, the last leaving October 9, but none had returned by April 7, though at that time the Purple Martin had been there about a month. The Cliff Swallow rarely breeds south of the parallel of 38°, hence the following note from Waverly, Miss. (lat. 33° 34′), is particularly interesting. April 10 a pair of these Swallows appeared and soon commenced house-building. Two broods were raised, and the nest, which was a great curiosity in that country, is still preserved. They were also found nesting in May at San Angelo, Tex. Had one seen the thousands and thousands of these birds which, one evening in the latter part of July, were resting on a marsh near Red Rock, Ind. Ter., he would have been tempted to believe that Professor Aughey's two thousand nests had poured out their entire contents on this particular place.

In the fall of 1884 the last Cliff Swallow was reported from Williamstown, Iowa, August 28, and from Unadilla, Nebr., September 5. The bulk left Williamstown July 17.

In the spring of 1885 a comparison of the records of the Cliff and White-bellied Swallows shows that these two species have been confounded by several of the observers east of the Mississippi River. The earliest record which really belongs to the Cliff Swallow is that of its arrival, April 12, at Paris, Ill. A single bird was seen at Tampico, Ill., April 18; and April 19 a few were noticed at a colony near Saint Louis, Mo. April 20 and 21 they reached Aledo, Ill.; Richmond, Iowa; Manhattan, Kans.; Clinton, Wis.; Lake Mills, Wis.; and New Cassel, Wis. They reached Lanesboro, Minn., April 23, and Lake City, Minn., April 26. North of these places migration was greatly delayed, apparently by the storms of the early part of May. Not until May 10 were Cliff Swallows noted from Minneapolis, Minn., and they were not reported from River Falls, Wis., until May 17. At Shell River, Manitoba, they arrived May 23.

In the fall of 1885 there was a great migration of Cliff Swallows past Saint Louis, Mo., September 8 and 9, and they were still present in numbers September 11. None were seen at Saint Louis after September 14, but one was observed at Grinnell, Iowa, September 16.

613. Chelidon erythrogaster (Bodd.). [154.] *Barn Swallow.*

A common summer resident throughout the Mississippi Valley, which it enters from the south very early in the spring; tolerably common in Manitoba. Mr. Lloyd states that in Tom Green and Concho counties, Tex., it raises two broods. March 6, 1884, it was found building at Eagle Pass, Tex. Farther east, and a little north (at Abbeville, La.), it was not seen until March 27; at Gainesville, Tex., the first one came April 1, and at Rodney, Miss., one was seen April 4. On the same day one appeared at Reeds, Mo. April 10 they were recorded at Fayette, Mo., and Burlington, Iowa, but the birds seen must have been stragglers, for none were reported from the neighboring stations till some time later.

Seven reports were received from Iowa in addition to that from Burlington, and all but one put the date of arrival later than May 1—most of them in the first week of May—while the records from northern Illinois and southern Wisconsin were all in April, from the 21st to the 27th. At Pine Bend, Minn., the first came May 2, and at Menoken, Dak., May 12. It must be confessed that this record looks rather mixed, and yet it is hardly to be wondered at when we consider the remarkable power of flight of the Swallow. Distance is nothing to it, and favorable atmospheric conditions for a few hours only might bring certain individuals north far beyond their fellows. At Saint Louis, Mo., Mr. Widmann found old pairs at their breeding places April 28, but the new pairs came and selected breeding places in May, even as late as May 22.

In the fall of 1884 the bulk of Barn Swallows left Williamstown, Iowa, August 28, and the last was seen September 9. The bulk left Mount Carmel, Mo., August 26, and the last was seen there September 6.

In the spring of 1885 the records of this species extended from March 1, when it reached Eagle Pass, Tex., to May 30, when it was reported from Ossowo, Manitoba. Hence it was ninety-one days in traversing

1,500 miles. At intermediate points it was noted at Emporia, Kans., April 11; Richmond, Kans., April 15; Unadilla, Nebr., April 28, and Menoken, Dak., May 13. Nearer the Mississippi River it was seen at Abbeville, La., March 15; Pierce City, Mo., April 9; Saint Louis, Mo., April 11; Paris, Ill., April 12; Hennepin, Ill., April 17; the southern edge of Wisconsin, northern Illinois, and the southern edge of Iowa, April 19; central Iowa April 22 and 23; central Wisconsin April 29; but no part of Minnesota was reached until after the cold wave had left, about the middle of May. In the fall of 1885, at Milwaukee, Wis., the last Barn Swallow was seen August 31. Great numbers passed Saint Louis, Mo., September 8 and 9, and the last disappeared September 14.

The note which I put into the Ornithologist and Oologist for April, 1884, page 37, concerning the commonness of this species during the winter in southern Louisiana, was not correct. Mr. Edwards, of Abbeville, La., informs me that it is seldom found there in winter, unless perhaps when a long period of warm weather occurs, which happens sometimes in December. But, however that may be, it enters the United States very early.

614. **Tachycineta bicolor** (Vieill.). [155.] *White-bellied Swallow.*

Breeds abundantly in Manitoba and most parts of the Mississippi Valley. This is the only swallow which winters regularly and abundantly in the United States. From its winter quarters in the Southern States it spreads north the earliest of its tribe. Indeed, so early is its migration that it is often overtaken by snow-storms, before which it usually retreats, though sometimes it remains to brave the elements. At Gainesville, Tex., in the spring of 1884 it did not arrive until April 30, though in former years it has been known to come by March 3. Nearer the Mississippi River, migration must have started early in March, probably when the warm wave set in, March 8 and March 9. A single bird was seen at Burlington, Iowa, March 10, but the regular advance occurred about two weeks later. If records of first arrivals are to be relied upon they show that the migration of this swallow took place much earlier east of the Mississippi than west of it. In Illinois and Wisconsin the records of "firsts" were: At Tampico and Chicago, Ill., March 24 and 26; at Lake Mills, Wis., April 4; and at West DePere and Green Bay, Wis., April 6. West of the Mississippi the first was reported from Coralville, Iowa, April 19, and Lanesboro, Minn., April 27. Two days later the first came in hundreds to Heron Lake, Minn., when the sun shone in the afternoon after a cold rainy forenoon. The first reached Pine Bend, Minn., May 2, and Frazee City, Minn., May 26. Still farther west migration was earlier than along the central line. At Argusville, Dak., it was seen May 5; and at Oak Point, Manitoba, May 3.

In the spring of 1885 the same warm wave which brought the Martins to the Upper Mississippi Valley induced many White-bellied Swallows to visit Missouri and Illinois. During the last two days of March and the 1st day of April they appeared at Saint Louis, Mo., Paris, Ill., and Fernwood, Ill. April 4 they were seen at Milwaukee, Wis.; April 5 at Green Bay, Wis.; April 7 at Lanesboro, Minn.; April 11 at Minneapolis, Minn., and April 28 at Oak Point, Manitoba. At Saint Louis, Mo., the last one was seen April 29; at Mount Carmel, Mo., May 2; and at Des Moines, Iowa, May 8. Some very late birds were recorded at Bonham, Tex., May 6, and at Gainesville, Tex., May 12.

In the fall of 1885, at Saint Louis, Mo., the first returned September 8; many passed October 5; they were most numerous October 9; and left October 26. They had left Grinnell, Iowa, September 16. Referring to these Swallows, Dr. Coues says: "They breed independently of latitude, some on the highlands of Mexico, and anywhere in the West; but in the East their usual breeding range is said to be north of the parallel of 38°" (Birds of the Colorado Valley, 1878, p. 415).

615. Tachycineta thalassina (Swains.). [156.] *Violet-green Swallow.*

The Violet-green Swallow can hardly claim a place among Mississippi Valley birds. It breeds, however, in western Nebraska, and Dr. Agersborg writes that he has taken it as an accidental visitant in southeastern Dakota. Mr. Lloyd states that it is a fall migrant in Concho County, Tex. Dr. Hatch includes it in his list of Minnesota birds. It winters beyond our borders, and passes northward to British America.

616. Clivicola riparia (Linn.). [157.] *Bank Swallow.*

An abundant summer resident throughout the district, from Manitoba southward. A few spend the winter along our southern border, but the great bulk pass further south—some even to Brazil. In Concho County, Tex., they are a rare fall migrant. They re-enter the United States quite early, but in 1884 none were reported until March 11, on which day they appeared at latitude 31° 52′ and latitude 33° 34′, in Mississippi. The records of the advance were not very regular, as the birds would rarely be seen unless their colonies were visited. About all that can be said from the notes is that during the last week of April they spread over the country from latitude 39° to latitude 44° 30′.

In the spring of 1885 the records of the Bank Swallow were even more irregular than in 1884. The earliest report was from Corinth, Miss., March 31; the latest from Shell River, Manitoba, April 30.

In the fall of 1885 the last left Milwaukee, Wis., August 14. Many were migrating at Saint Louis, Mo., August 12 and August 20. August 24 was a day of great migration at Saint Louis, and the last was seen there September 9.

617. Stelgidopteryx serripennis (Aud.). [158.] *Rough-winged Swallow.*

This swallow breeds over most of the Mississippi Valley, even north to Minnesota, but is most abundant in the Southern States. Few observers, however, are able to distinguish it from the Bank Swallow; hence notes on it are few, and are confined to the notice of its arrival on the same day, April 15, at Saint Louis, Mo., and Manhattan, Kans.; and its appearance the next week at Des Moines, Iowa, and Lanesboro, Minn. At Saint Louis it was sitting on eggs May 16.

In the fall of 1884 the last Rough-winged Swallow was seen at Des Moines, Iowa, August 19.

In the spring of 1885 the first was seen at Manhattan, Kans., April 11, and the next April 22. It arrived at Saint Louis, Mo., April 14; but at Des Moines, Iowa, none were seen till April 24. It reached Lanesboro, Minn., April 21; and Lake City, Minn., April 25. A nest was found at Manhattan, Kans., May 13.

In the fall of 1885 it was last seen at Saint Louis, Mo., September 30.

618. Ampelis garrulus Linn. [150.] *Bohemian Waxwing; Northern Waxwing.*

We must look to the northern observers for notes on this species. From its summer home in British America it wanders south in winter over Manitoba and the Northern States. Any regular study of its migration is difficult because of the irregularity of its movements, which seem to depend in part on the food supply. The most southern locality at which it was seen in the winter of 1883–'84 was Ames, Iowa, where it was noted during November and December. It has been known in previous years to reach Kansas and Illinois, and in the Rocky Mountains has occurred south to latitude 35°. It was seen at Vermillion, Dak., February 26, 1884; at Waukon, Iowa, in January; at Milwaukee, Wis., all through the winter to March 26; at West De Pere, Wis., April 8; and at Red Wing, Minn., the last had not left April 1.

In the spring of 1885 a few records were contributed of the presence of this wanderer in the northern Mississippi Valley. They are as follows: Laporte City, Iowa, January 29; Vermillion, Dak., hundreds of them March 7; Minneapolis, Minn., March 4 and 9; and Elk River, Minn., February 24.

619. Ampelis cedrorum (Vieill.). [151.] *Cedar Bird; Cedar Waxwing.*

The Cedar Bird is an abundant summer resident in Manitoba and over much of the Mississippi Valley. It is another irregular wanderer whose migratory movements can not yet be traced with accuracy. At any particular place in the Mississippi Valley it may or may not winter. Some idea of the irregularity of its movements can be obtained from the records of its appearance in 1884 at different points between the parallels of latitude 40° and 42°. It was first seen at Fayette, Mo., February 2; at Danville, Ill., June 3; at Rockford, Ill., April 18; at Chicago, Ill., March 31. The bulk arrived at Burlington, Iowa, April 20; and the last left Iowa City, Iowa, April 24. Dr. Agersborg saw a flock at Vermillion, Dak., during January, and Mr. Lloyd tells us that the Nueces Cañon in southwestern Texas is the winter home of countless myriads; these two wintering places are over a thousand miles apart. Towards the northern portion of its range the species is not so common, but it goes far north, even to latitude 54°. At Oak Point, Manitoba (lat. 50° 30′ N.) it was first seen May 5. One of the most peculiar characteristics of the species is the late date at which it begins nest building. As if enjoying its Bohemian life, and disinclined to settle down in one place, it loiters around and puts off its house-keeping affairs until the last moment. It does not even mate, but lives in flocks, a happy, careless wanderer, until the hot days of the first half of June warn it that there are other duties to which it must give its attention.

In the fall of 1884 the bulk of Cedar Birds left Williamstown, Iowa, September 15, and the last was seen there September 30. At Des Moines, Iowa, the bulk and last were seen October 25.

In the spring of 1885, after learning that this bird had been common at Elk River, Minn., since January 15, it was discouraging to find its arrival noted a thousand miles farther south in May.

620. Phainopepla nitens (Swains.). [26.] *Phainopepla.*

An inhabitant of the arid region of Mexico, and contiguous portions of the United States, from western Texas to southern California. It has been taken at Eagle Pass, Tex.

621. Lanius borealis Vieill. [148.] *Great Northern Shrike.*

A winter visitant from the north; in Manitoba a spring and fall migrant.

This bird was reported present as usual during the winter of 1883-'84 over all of the northern half of the Mississippi Valley, down to latitude 39°. The last one at Manhattan, Kans., was seen at the rather late date of March 29. At Portage La Prairie, Manitoba, it was said not to have been seen until spring, and the first was recorded April 11, but was heard of two weeks before.

In the fall of 1884 the first Great Northern Shrikes were reported from Des Moines, Iowa, and Emporia, Kans., November 8.

In the spring of 1885 the notes received indicate no regularity in its movements. At Manhattan, Kans., the first and last were reported February 21, and at Grinnell, Iowa, March 31. At Chicago, Ill., the first was seen February 8, and the next, March 13. It arrived at Shell River, Manitoba, March 14.

In the fall of 1885 the first migrant was reported from Milwaukee, Wis., October 31, and from Grinnell, Iowa, October 20.

622. Lanius ludovicianus Linn. [149.] *Loggerhead Shrike.*

The true home of this species is in the southern Atlantic States, from which it pushes west and northwest to a greater or less degree. It is common and resident, according to Mr. Lloyd, at San Angelo, Tex. In the spring of 1884 I shot a true Loggerherd at Caddo, Ind. Ter., where the White-rumped is the common form; and at Saint Louis, Mo., Mr. Widmann gives it as the prevailing form, the White-rump rarely occurring. The full record at Saint Louis is as follows:

> First seen January 31, and again February 2; the bulk did not arrive until March 22, and the next day they began mating. Three nests were found April 11, and on May 31 young birds were flying around, led by their parents, which seemed to have undergone a bleaching process, looking much lighter than two months before."

622 a. Lanius ludovicianus excubitorides (Swains.). [149 a.] *White-rumped Shrike.*

This is the common Shrike of the Mississippi Valley. It breeds abundantly in western Manitoba, and is resident in the southern part of its range, but retires in winter from the northern portion. At Caddo, Ind. Ter., it is a common summer resident, and many remain through the winter. In western Texas it is an abundant resident. No special migratory movement was observed south of the middle districts. It was recorded as reaching central Iowa March 24, and the vicinity of Minneapolis, Minn., March 31. Mr. S. W. Willard did not find it at West De Pere, Wis., until April 4. The limit of its northern range is in the neighborhood of latitude 54°.

In the spring of 1885 the White-rumped Shrike was seen at Chicago, Ill., March 3; and the same species came to Clinton, Wis., April 4; Grinnell, Iowa, April 5; Lake City, Minn., April 4, and New Richmond, Wis., April 11. Mr. Lloyd says of its habits in western Texas:

> It lives on grasshoppers when it can procure them, and in winter, when the weather is severe, takes to carrion. I found one in January, 1884, so gorged from feeding on a dead sheep that it could not fly. In the Davis Mountains it lives in winter on large coleoptera. In spring it occasionally kills birds. I have seen *Spizella socialis arizonæ, Vireo belli, Polioptila cærulea,* and others amongst its victims, and in summer it has a fancy for nestlings. It is usually very tame. (The Auk, Vol. IV, 1887, p. 295.)

624. Vireo olivaceus (Linn.). [135.] *Red-eyed Vireo.*

Breeds throughout Manitoba and the Mississippi Valley, after wintering below our southern border, which, in 1884, it crossed late in March, appearing at Gainesville, Tex., April 5. It was recorded from Saint Louis April 26; from latitude 39° 12′, in Kansas, April 30; and latitude 40° 8′, in Illinois, May 1. A week later, May 8, it was noted from latitude 40° 50′, in Iowa. It reached Waukon, Iowa, (lat. 43° 15′) May 18, and the next night several were killed by the electric light at La Crosse, Wis. (lat. 43° 45′). The bulk was noted from latitude 43° 43′, in Minnesota, May 25, after the first had come to latitude 44° 26′, in Wisconsin, May 21.

In the fall of 1884 the bulk of Red-eyed Vireos left Williamstown, Iowa, August 28, and none were seen afterward.

In the spring of 1885 the first was seen at San Angelo, Tex., April 9; at Gainesville, Tex., April 17, and at Manhattan, Kans., April 29. Eastward it came to Saint Louis and Mount Carmel, Mo., April 21, and the next was seen at each of these places April 24. At Paris, Ill., it was reported April 28; Newton, Iowa, May 1; Waukon, Iowa, May 13; Lanesboro, Minn., May 14, and New Richmond, Wis., May 23.

In the fall of 1885 the last was seen at Grinnell, Iowa, September 9. Many were present at Saint Louis, Mo., September 21, and the last was seen there October 10. Mr. Lloyd says it is an abundant summer resident in Tom Green County, Tex.

625. **Vireo flavoviridis** (Cass.). [136.] *Yellow-green Vireo.*

A bird of Mexico and Central America, coming north to the Lower Rio Grande Valley in Texas, where a single specimen was taken by Dr. Merrill, August 23, 1877.

626. **Vireo philadelphicus** (Cass.). [138.] *Philadelphia Vireo.*

This is not a common species in the Mississippi Valley, though apparently more common here than in the Eastern States. Little is known of its breeding range. A nest was found near Duck Mountain, Manitoba, June 9, 1884, by Mr. Ernest E. Thompson (Auk, Vol. II, 1885, pp. 305, 306). In 1884 it was noted by two observers only—one at Chicago, May 21, the other at Lanesboro, Minn., May 20. It has not yet been taken in Kansas.

In the spring of 1885 the first Philadelphia Vireo reached Saint Louis May 8. The first record from Des Moines, Iowa, was May 14, and the last was seen there May 20. At Lanesboro, Minn., the first was seen May 18.

In the fall of 1885 the first migrant returned to Saint Louis September 21, and the last was seen there September 27.

627. **Vireo gilvus.** (Vieill.). [139]. *Warbling Vireo.*

Common in Manitoba and throughout the Mississippi Valley; breeds throughout its range, and winters beyond our southern border. In the spring of 1884 it arrived at Saint Louis April 19, and the bulk came April 29. At this latter date the first came to Manhattan, Kans., followed the next day by the bulk. This day (April 30) also brought the first to Coralville, Iowa, though few were seen until May 3. At Waukon, Iowa, the first was recorded May 10, and the bulk May 18. The first was seen at Lanesboro, Minn., May 18. They had previously been noted (May 3) from Danville, Ill., and (May 11) West De Pere, Wis. At San Angelo, Tex., May 5, 1884, Mr. Lloyd took two males, which pertain to the form then known as *V. swainsoni*, but which is now considered to be not distinct from the eastern *V. gilvus.*

In the fall of 1884 the bulk of Warbling Vireos left Williamstown, Iowa, August 8, and none were seen after that date.

In the spring of 1885, at Saint Louis, Mo., the first was seen April 22, and the bulk of males arrived next day. Their migration north of Saint Louis was not quite so rapid. The first came to Manhattan, Kans., April 27; to Paris, Ill., April 28; Hennepin, Ill., May 1; Waukon, Iowa, May 13; Lanesboro, Minn., May 15, and Heron Lake, Minn., May 19.

In the fall of 1885 none were seen at Saint Louis, Mo., after September 22.

628. Vireo flavifrons Vieill. [140.] *Yellow-throated Vireo.*

In summer this Vireo is dispersed throughout the Mississippi Valley, but it is rare in Manitoba. In winter it is not found north of Florida. In 1884 it must have crossed our border very early, as it appeared at Gainesville, Tex., March 6. Saint Louis was reached April 17. At Manhattan, Kans., where it is rare, it was seen May 3; at La Porte City and Waukon, in Iowa, May 5; and Lanesboro, Minn., May 10. It was first seen at West Depere, Wis., May 7.

In the fall of 1884 the bulk of Yellow-throated Vireos left Williamstown, Iowa, August 11, and none were seen there after that date. At Mount Carmel, Mo., the last was seen September 21.

In the spring of 1885 the first came to Gainesville, Tex., April 6, and they were commom there April 17. At Saint Louis, Mo., they appeared April 20. They were seen at Chicago, Ill., April 21; at Manhattan, Kans., April 22; Mount Carmel, Mo., April 23; Rockford, Ill., May 9; Iowa City, Iowa, May 10; Waukon, Iowa, May 10; and Durand, Wis., May 15.

In the fall of 1885 the last was seen at Grinnell, Iowa, September 10; at Mount Carmel, Mo., September 20; and at Saint Louis, where they were numerous September 26, the last was seen October 12.

629. Vireo solitarius (Wils.). [141.] *Blue-headed Vireo.*

This Vireo winters below our southern border, and breeds principally in Manitoba and the Northern States, occasionally as far south as the 40th parallel, and in a few rare instances still farther south.

In 1884 it was reported from Saint Louis April 29; and from no other station previous to May 10, but on that day it appeared simultaneously at Burlington and Des Moines, Iowa, and at Minneapolis and Elk River, Minn. This same day the last one was seen at Saint Louis, making its stay there only eleven days; so that not only did the van move rapidly, but the species as a whole must be one of the most rapid migrants in the Mississippi Valley.

In 1883, when calculating the average speed of migration for more than a hundred species, it was found that the Solitary Vireo had the highest rate. It seemed to advance all at once, and its rate of speed was estimated at more than 80 miles a day. In 1884 its rate seemed to have been much the same.

In the spring of 1885 the record of the migration of the Solitary Vireo was so irregular that, while its character as a rapid migrant was maintained, no average rate of speed can be calculated from it. The whole record received is as follows: At Mount Carmel, Mo., and La Porte City, Iowa, the first were noted April 26; Paris, Ill., April 28; Saint Louis, Mo., April 30; Waukon, Iowa, May 3; Delaware, Wis., May 7, and Lanesboro, Minn., May 7.

The record of "lasts" was still more irregular. It is as follows: La Porte City, Iowa, April 27; Mount Carmel, Mo., May 3; Des Moines, Iowa, May 8; Saint Louis, Mo., May 13; Waukon, Iowa, May 15.

In the fall of 1885 the first came to Emporia, Kans., September 17, and to Saint Louis, Mo., September 25. None were seen at Des Moines, Iowa, after September 16, nor at Saint Louis, Mo., after October 3.

630. **Vireo atricapillus** Woodh. [142.] *Black-capped Vireo.*

When Coues's Birds of the Colorado Valley was published, in 1878, but four specimens of this Vireo were known, and its easternmost record was western Texas. Mr. Ragsdale has extended its range and brought it fairly within our district by procuring specimens in Bandera County, Tex., where it arrived March 19; and, later, by finding it near the northern boundary of Texas, in Cook County, where he has determined it to be a rare summer visitant. In 1884 he shot but one specimen. At Boerne, Tex., Mr. Brown took it March 27, 1880. At San Angelo, Tex., Mr. Lloyd was more fortunate, securing four of the eight or ten birds which he saw. There, also, it is a summer resident, occurring along the borders of the densest thickets in an unfrequented part of the county. Mr. Lloyd afterwards took several of its nests in Tom Green County. Recently, Colonel Goss has found it breeding plentifully in Comanche County, Kans.

In the fall of 1884 the last male Black-capped Vireo was reported from San Angelo, Tex., September 25; while the last female was seen there September 6.

In the spring of 1885 a pair was seen at San Angelo April 6, and they had become common there by April 9. At Gainesville, Tex., the first was seen April 17.

In the fall of 1885 they were leaving San Angelo September 16.

631. **Vireo noveboracensis** (Gmel.). [143.] *White-eyed Vireo.*

Breeds throughout most of the Mississippi Valley, south of Minnesota, occasionally reaching westward to the eastern foot-hills of the Rocky Mountains.

In Kansas it is a common summer resident. In the valley of the Lower Rio Grande, in Texas, it is a permanent resident (Merrill). The winter home of this species extends from the Southern States southward. In the spring of 1884 its northward migration began the latter part of March, and it arrived at Gainesville, Tex., just beyond its winter home, March 24. The next day three were shot and two were heard at Caddo, Ind. Ter. It was reported at Saint Louis, April 17; at Danville, Ill., April 27; at Iowa City, Iowa, April 30; and on May 26, probably many days after it had arrived in that latitude, it was seen at Heron Lake, Minn., which is near its northern limit.

In the spring of 1885 the first White-eyed Vireo appeared at Gainesville, Tex., March 23; at Corinth, Miss., April 7; and at Saint Louis, Mo., and Grinnell, Iowa, April 20. At Paris, Ill., the first was not seen until April 28, and at Pierce City, Mo., not until May 8. It became common at Gainesville, March 31; at Corinth, April 15; and at Saint Louis, April 23.

Mr. Lloyd says it is a fall migrant in western Texas.

In the fall of 1885 the last was seen at Grinnell, Iowa, September 28 At Saint Louis the bulk was present September 25; the bulk departed September 29, and the last was seen October 14.

632a. Vireo huttoni stephensi Brewst. [——.] *Stephen's Vireo.*

The known habitat of this western subspecies is in Arizona, western Mexico, and Lower California. Its presence in our district has been ascertained by Mr. Lloyd, who took half a dozen specimens at Fort Davis, Tex., where it was rare in the winter of 1885–'86. The specimens were identified by Mr. Ridgway.

633. Vireo belli; Aud. [145.] *Bell's Vireo.*

Though a bird of the western United States, Bell's Vireo comes eastward far enough to invade much of the Mississippi Valley. It has been found breeding in Illinois, and extends north to Minnesota and Dakota. From Kansas to southeastern Texas it is an abundant summer resident. Its winter home appears to be in the Southwest, and the birds which spend the summer in the region along the Mississippi probably reach it by a northeast and eastward migration. It was found in central and northern Texas during the middle of April, and was reported as very common at San Angelo, Tex. The last of April and the 1st of May it was reported from southern and east-central Missouri, and the middle of May from central Iowa. By May 11 it had arrived at Saint Louis in full numbers and was at its breeding places. At the same time the bulk arrived at Manhattan, Kans., where the first was seen April 27. At this point it is very abundant, being the characteristic summer Vireo, and many nests are taken annually. At San Angelo, Tex., the species breeds from May 1 to July 3, and Mr. Lloyd has taken clutches of five, six, seven, and two of eight eggs each.

In the fall of 1884 the last Bell's Vireo was seen at Mount Carmel, Mo., August 27.

In the spring of 1885 Bell's Vireo was one of the few species the record of whose migration in Texas was regular. It was seen at San Antonio, April 7; San Angelo, April 16; and Gainesville, April 23. It reached Manhattan, Kans., and Paris, Ill., April 28, and Saint Louis, Mo., April 29. At Hennepin, Ill., one was seen May 3; and at Grinnell, Iowa, May 14. The bulk arrived at Saint Louis May 3.

In the fall of 1885 the dates of departure of this species from Grinnell, Iowa, Mount Carmel, Mo., and Saint Louis, Mo., fell within the five days from August 27 to September 1.

634. Vireo vicinior Coues. [147.] *Gray Vireo.*

The home of this Vireo is in western Texas, and thence westward to southern California.

636. Mniotilta varia (Linn.). [74.] *Black and White Creeper.*

With this species we take up a group of strictly migratory birds, the greater number of which migrate so late that their tiny forms can hardly be seen amid the thick foliage. Moreover, the number of different species is so great, and the variations of plumage so endless, that the young student of ornithology is bewildered, and for the first year is compelled to leave the subject with the single note, "great numbers of Warblers came last night, and to-day the woods are full of them." The Black and White Creeper is one of the best known of these Warblers, and one of the few which breed throughout the whole Mississippi Valley and Manitoba.

Forsaking this district in winter, it returns late in February or early in March. In the spring of 1884 they arrived at both Manhattan, Kans., and Saint Louis, Mo., April 17—a thing which seldom happens, as Western birds are usually later than Eastern. After a pause of a few days, they advanced rapidly on April 27 and April 28 to latitude 42°. May 1 found them at latitude 44°, and May 10 at latitude 47° 30′. The bulk followed some ten or twelve days in the rear. This species has not yet been traced west to the Rocky Mountains, but it has been found in Texas as far west as San Angelo, and it was seen April 9 at Gainesville, Tex.

In the fall of 1884 the bulk of Black and White Creepers left Williamstown, Iowa, August 22, and the last September 5. The bulk left Mount Carmel, Mo., August 25, and the last September 11. At San Angelo, Tex., the last was seen September 23.

In the spring of 1885 the notes on the Black and White Creeper indicate that it moved earlier in the western part of the district than in he eastern, or else that it was confounded with some other bird. The first was recorded at Gainesville, Tex., March 31, and the remark was made that this date was ten days later than the earliest record of previous years. It was reported from Corinth, Miss., April 7. The next note came from Manhattan, Kans., where it was reported April 15. At Mount Carmel, Mo., it was seen April 18. During the three days from April 21 to April 23 it was seen at Saint Louis, Mo.; Paris, Ill.; Chicago, Ill.; Fernwood, Ill.; Des Moines, Iowa; Waukon, Iowa, and Lanesboro, Minn. At Chicago they were marked common April 21. After a long pause they advanced to Ripon, Wis., May 5, and were noted from New Richmond, Wis., May 10. One was seen at White Earth, Minn., May 16.

In the fall of 1885 the last was seen at Saint Louis, Mo., September 25. It disappeared from River Falls, Wis., September 15. The first appeared at San Angelo, Tex., September 3.

637. Protonotaria citrea (Bodd.). [75.] *Prothonotary Warbler.*

Winters beyond our southern border, and advances in spring regularly to southern Indiana, Illinois, Iowa, and Nebraska, and occasionally a little farther, breeding throughout its United States range.

August 16, 1874, Dr. Hvoslef shot a Prothonotary Warbler in western Wisconsin, opposite the mouth of the Root River. The most northern record of its occurrence is that of F. L. Grundtvig, who procured a handsome male at Shiocton, Outagamie County, Wis., May 4, 1882.* In eastern Kansas it is a common summer resident (Goss).

Its earliest record in the spring of 1884 came from Rodney, Miss., where it was first seen April 13. Five days later it was reported from Saint Louis. Hence it is probable that it really reached Rodney several days previous to the 13th. It was seen at Burlington, Iowa, May 3; north of that no dates of arrival were recorded. At Manhattan, Kans., near the limit of its western range, it was much later in its movement, not being seen until May 14. Nor was it reported from Gainesville, Tex., until May 12, though of course it arrived much earlier.

The Prothonotary Warbler was found as an abundant summer resident at Red Rock, Ind. Ter., in 1884.

In the spring of 1885, Gainesville, Tex., was the first station to report its presence. It arrived there April 17. Three days later it appeared at Saint Louis, Mo., and April 21 it was seen at Paris, Ill. The bulk reached Saint Louis April 29.

In the fall of 1885 the last was seen at Bonham, Tex., August 10.

638. **Helinaia swainsonii** Aud. [76.] *Swainson's Warbler.*

A Southern species, until recently one of the rarest of North American birds. It has been taken in South Carolina, Georgia, Florida, Louisiana, and Texas, and winters in Cuba and Jamaica. In the spring of 1886 "about three dozen" Swainson's Warblers were shot near Lake Pontchartrain, Louisiana, by Mr. Charles S. Galbraith (Lawrence, The Auk, Vol. IV, 1887, p. 37). In the spring of 1887 nine additional specimens were secured in the same locality (*Ibid.*, p. 63). Mr. C. W. Beckham considers the bird a common summer resident at Bayou Sara, La. (*Ibid.*, pp. 304, 305). The only Texas record is that of a specimen killed in Navarro County, in the east-central part of the State, by Mr. J. Douglas Ogilby, and recorded by Mr. Ridgway (Bull. Nutt. Ornith. Club, Vol. VI, 1881, pp. 54, 55).

639. **Helmitherus vermivorus** (Gmel.). [77.] *Worm-eating Warbler.*

Winters south of our district and breeds throughout its United States range, which extends in summer to Illinois and Nebraska. Rare in Kansas (Goss) and in southeastern Texas (Nehrling).

The only note on this species contributed in the spring of 1884 is to the effect that the first was seen at Saint Louis April, 29.

In the spring of 1885 the Worm-eating Warbler first appeared at Pierce City, Mo., May 9, and at Saint Louis, May 4. At Mount Carmel, Mo., the first was reported May 20, and at Paris, Ill., May 3. At Mount Carmel the last was seen May 24.

640. **Helminthophila bachmani** (Aud.). [78.] *Bachman's Warbler.*

This rare and much-sought-after Warbler occurs in the South Atlantic and Gulf States from South Carolina to Louisiana. In winter it has been found in western Cuba. Until very recently (the spring of 1886) more than half a century had elapsed since the publication of any positive record of its capture in the United States. In the spring of 1886 a single specimen was shot at Lake Pontchartrain, Louisiana, by Charles S. Galbraith, a collector of birds for millinery purposes. Fortunately it was given to the veteran ornithologist Mr. George N. Lawrence, who promptly recorded the fact in the Auk (Auk, Vol. IV, 1887, pp. 35–37.) This was followed by a notice of a specimen which killed itself against the light-house at Sombrero Key, Florida, March 21, 1887 (Merriam, *Ibid.*, p. 262), and by a second article by Mr. Lawrence, recording the capture of six additional specimens at Lake Pontchartrain by Mr. Galbraith. All were killed in the spring of 1887, but the only exact date given is March 29, when one of the males was shot (*Ibid.*, pp. 262–263.) In March, 1888, Mr. Galbraith collected thirty-two specimens on the borders of Lake Pontchartain, La. He considers them migrants and not summer residents, as no specimens were seen after the latter part of March, although they were diligently sought for up to the middle of April (*Ibid.*, Vol. V, p. 323.)

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* Bull. Nutt. Ornith. Club, vol. viii, April, 1883, p. 68.

641. **Helminthophila pinus** (Linn.). [79.] *Blue-winged Yellow Warbler.*

A tolerably common summer resident over most of the Mississippi Valley except the extreme northern portion. When this beautiful Warbler entered the United States in 1884 and 1885, or how fast it journeyed northward, the record does not tell. All the notes came from the middle district where it is nearly at the limit of its northward range. It is not yet known from northern Illinois, and the most northern record in that state in 1884 was from Carlinville, where it arrived April 30. West of the Mississippi, its northward extension is greater. The first reached Saint Louis, Mo., April 24; the bulk April 30; and migrating individuals were still passing May 5. It reached latitude 42° May 3. North of this there was no record in 1884, but the species is not uncommon in southern Minnesota. The most western record came from Ellis, Kans.

In the fall of 1884 the Blue-winged Yellow Warbler was last seen at Des Moines, Iowa, August 29.

In the spring of 1885 no records were received of its movements until it reached Saint Louis, Mo., April 21. Two days later it was seen at Mount Carmel, Mo. It arrived at Emporia, Kans., April 28, and at Peoria, Ill., April 29. It was seen at Des Moines, Iowa, May 4; at Iowa City, Iowa, May 8. Two records were received of its appearance May 7 at points near the extreme northern limit of its range. Dr. Hvoslef secured it for the first time at Lanesboro, Minn., and a few miles farther east, at La Crosse, Wis., Mr. C. H. Stoddard obtained a specimen. This is the first Wisconsin record from any of the observers.

642. **Helminthophila chrysoptera** (Linn.). [81.] *Golden-winged Warbler.*

This handsome Warbler breeds in Minnesota, Wisconsin, and Michigan. The record of its northward migration in 1884 began at latitude

37° April 25, and ended at latitude 45° May 14. Dr. Coues says it breeds throughout its United States range, but Mr. Ridgway says it does not breed in southern Illinois, and Mr. Widmann noted the last at Saint Louis, May 11. In southeastern Texas it is common during the migrations (Nehrling.) Its dispersion in the west is limited. It has been found a few times in Nebraska, but it is "not yet authentic as a bird of Kansas."

In the fall of 1884 the Golden-winged Warbler was last seen at Mount Carmel, Mo., August 24.

In the spring of 1885 the record at Saint Louis was as follows: First, April 28; bulk arrived May 4; bulk departed May 14; and last, May 22. At Iowa City, Iowa, the first was reported May 17; at Fernwood, Ill., May 18; at Chicago, Ill., May 9; and Durand, Wis., May 17. Dr. P. R. Hoy has taken two nests at Racine, Wis.

645. Helminthophila ruficapilla (Wils.). [85.] *Nashville Warbler.*

Although more properly a bird of the east, this Warbler is found in migration throughout the Mississippi Valley. It breeds from northern Illinois and Nebraska northward, but is rare in Manitoba. In winter it is not found within our borders. The earliest record in the spring of 1884 came from Gainesville, Tex., where the first arrival was noted March 19. This was followed by a long interval without a record, and the next note came from Saint Louis, the first male arriving there April 29. The rest of the Saint Louis record is that the bulk arrived from April 30 to May 3; bulk left May 12, and the last was seen May 17. Before this, on May 8, it had advanced to latitude 43° 15′ in Iowa; and May 10 to latitude 44° 26′ in Wisconsin. Many were seen at Lanesboro, Minn., May 13.

In the spring of 1885, as in 1884, the earliest record of the migration of the Nashville Warbler came from Gainesville, Tex., where the first was seen April 18. This is almost a month later than its arrival at the same place in 1884. At Saint Louis, Mo., the first was seen April 20, and the bulk arrived there April 30. On May 6 and 7, Nashville Warblers were seen at Lanesboro, Minn., Durand, Wis., and River Falls, Wis. The bulk left Saint Louis May 14, and the last May 22. None were noted at Waukon, Iowa, after May 19.

In the fall of 1885 the Nashville Warbler was one of several species of Warblers which appeared very early at San Angelo, Tex. Both this and the Canadian Flycatching Warbler were seen there before they appeared at Saint Louis, Mo., more than five hundred miles to the northeastward. Unless these instances are purely accidental, they would indicate a breeding range in the Rocky Mountains much farther south than its breeding range near the Mississippi River. The first was shot at San Angelo, Tex., September 13, but it was not seen at Saint Louis till September 17. Many birds in high plumage were present at Saint Louis, September 22, and the species continued in great numbers until October 10, when it suddenly disappeared. The last was seen October

12. At Emporia, Kans., the first was noticed October 6, and at Gainesville, Tex., October 11.

645 a. Helminthophila ruficapilla gutturalis Ridgw. [85, part.] *Calaveras Warbler.*

The western United States, from the Rocky Mountains to the Pacific, is the habitat assigned to this sub-species by the A. O. U. Check List. Its known range has been extended lately by Mr. William Lloyd, who took it in Concho County, Tex., where it is an abundant fall migrant. The specimens were identified by Mr. Ridgway.

646. Helminthophila celata. (Say). [86.] *Orange-crowned Warbler.*

The Orange-crowned Warbler breeds north of the United States and winters in the South Atlantic and Gulf States and in eastern Mexico. It is not a very noticeable Warbler, but seems to occur abundantly at several points in our district. It has been found occasionally in large numbers in northwestern Minnesota and Manitoba. Recently Mr. Lloyd has reported it as an abundant fall migrant in western Texas, and Colonel Goss says it is a common migrant in Kansas. Mr. Brown found it the most abundant Warbler in spring migration at Boerne, Tex. In the valley of the lower Rio Grande in Texas it is rather common during the colder months (Merrill). In the spring of 1884 it arrived at latitude 37° April 19, and was still present May 1. All the dates given for the country between latitude 39° and latitude 44° were in the few days from May 8 to 12. It would seem then that the species, after pausing or proceeding slowly, accelerated its pace on those four days, which were great days for movements among Warblers all over the Mississippi Valley.

In the spring of 1885 the records of the migration of the Orange-crowned Warbler were very regular. It first appeared at San Angelo, Tex., April 2; at Gainesville, Tex., April 17; Saint Louis, Mo., April 22; Emporia, Kans., April 25; Paris, Ill., May 3; Des Moines, Iowa, May 2; Lanesboro, Minn., May 4; New Richmond, Wis., May 13. None were seen at Des Moines, Iowa, after May 12, nor at Lanesboro, Minn., later than May 25.

The breeding range of the Orange-crowned Warbler extends much farther south in the West than in the Mississippi Valley. Hence it is not surprising that in fall migration it appears at San Angelo, Tex., nearly three weeks before it reaches Saint Louis.

In the fall of 1885 the arrival of the first at San Angelo, Tex., was noted September 4; while at Saint Louis, Mo., the first came September 21. The species was abundant at Saint Louis, October 10, and the bulk was still present October 17. At Lanesboro, Minn., the last was seen October 2.

At Warrensburg, in western Missouri, it is an abundant spring migrant, being common from the latter part of April till the middle of May (Scott, Bull. Nutt. Ornith. Club, Vol. IV, 1879, p. 141).

647. Helminthophila peregrina (Wils.). [87.] *Tennessee Warbler.*

From its winter home beyond our borders, the Tennessee Warbler enters the United States early in April. It breeds from Minnesota northward. In Kansas it is a common migrant (Goss). In the spring of 1884 it had reached Saint Louis, Mo., April 29, and other notes, though few, indicate pretty regular progress northward. Burlington, Iowa, was reached May 11; Lanesboro and Heron Lake, Minn., May 13 and May 16; and West Depere, Wis., May 21. At Saint Louis the bulk came May 5, and left May 13, just as the first reached Lanesboro, Minn. May 18 it was the most common bird of the day at Lanesboro, and three days later the last one left Saint Louis, so that on May 21 the whole of the species, according to the record, was included between latitude 38° 40′ and latitude 44° 26′.

In the spring of 1885 no record was received of its movements until the first reached Saint Louis April 28. The bulk arrived there April 30. At Paris, Ill., the first was seen May 3; at Chicago, May 9; at Delavan, Wis., May 2; at Lanesboro, Minn., May 7, and at White Earth, Minn., May 16. The bulk left Saint Louis, Mo., May 16, and the last was seen there May 22. At Lanesboro the last was noted May 26.

In the fall of 1885 the only station contributing a record of the Tennessee Warbler was Saint Louis, Mo., where the first arrived September 21. It was numerous by September 26, and increased in abundance till October 6, when it was heard and seen everywhere. These great numbers continued until October 12. The bulk left October 17, and the last followed October 20. Mr. Lloyd states that in Tom Green County, Tex., it is an early fall migrant, and is tolerably common; and Mr. Nehrling says it is not uncommon during migration in southeastern Texas.

648. Compsothlypis americana (Linn.). [88.] *Blue Yellow-backed Warbler; Parula Warbler.*

The large majority of Parula Warblers go to the Northern States and British America to breed, but a few have been detected rearing their young in various parts of Nebraska and Illinois, and Mr. Nehrling has found them in the breeding season as far south as Pierce City, Mo., and also in southeastern Texas, near Houston. Colonel Goss thinks they breed in eastern Kansas, where they are a common migrant, and they have been seen during the whole of the summer in northern Mississippi. Dr. Fisher found them quite common in the vicinity of Lake Pontchartrain, La., in the summer of 1885. They winter just beyond the southern border of the United States. In the spring of 1884 they started northward early in March, reaching Caddo, Ind. Ter., March 25. They were recorded at Saint Louis, Mo., April 14, and at West Depere, Wis., May 10. The bulk followed closely, not more than three or four days later than the van, so that from the dates of first arrival the movements of the bulk may be predicted.

In the spring of 1885 the first Blue Yellow-backed Warblers were noted as follows: Houma, La., March 28; Gainesville, Tex., April 17; Saint Louis, Mo., April 17; Chicago, Ill., May 9, and Milwaukee, Wis., May 5. It became common at Houma April 7, and at Saint Louis April 21.

In the fall of 1885 it was last seen at Saint Louis October 6.

649. Compsothlypis nigrilora (Coues). [89a.] *Sennett's Warbler.*

This warbler is known only from the Lower Rio Grande Valley in Texas, where it is a common summer resident (Sennett; Merrill). In the vicinity of Fort Brown it arrives about the third week in March (Merrill).

650. Dendroica tigrina (Gmel.). [90.] *Cape May Warbler.*

The Cape May Warbler winters south of our border and crosses the United States in its migrations to its northern breeding grounds. A few years ago the region east of the Mississippi was regarded as its home, and any record west of it was considered as accidental; but since more than two-thirds of the notes for 1884 came from the western side, the question arises whether the species may not be moving westward. Throughout most of the east it is rather rare, but in east-central Wisconsin it has been found in great numbers, "hundreds seen in a day";* in Minnesota it is stated to be very common in migration, and in western Manitoba it is not rare. The most southwestern of the records is that from Pierce City, Mo., where it was found April 27, 1884. It reached latitude 42° 06′ May 5; was taken at West Depere, Wis., May 11, and by May 23 had arrived at Elk River, Minn. A female was taken at Lanesboro, Minn., May 21. It was also taken in Iowa, but the most interesting record is of its occurrence in Nebraska. Mr. Powell writes that at Alda, Nebr., May 12, 1883, he took an old male in good plumage, and a few days later three birds, probably of this species, were seen.

In the spring of 1885 the few notes received on the movements of the Cape May Warbler indicate that its migration was very regular. "Firsts" were reported as follows: Saint Louis, Mo., May 12; Delavan, Wis., May 14; Lanesboro, Minn., May 18; and Elk River, Minn., May 20. A sudden cold snap stopped their migration and they took refuge, May 18, in the heavy timber near Lanesboro, Minn. Throughout the day they were exceedingly numerous. The next day not one was found. In the fall of 1885 they first appeared at Saint Louis, September 9.

651. Dendroica olivacea (Giraud). [92.] *Olive Warbler.*

Inhabits the highlands of Mexico and Guatemala, coming north to Texas (Giraud) and Arizona.

652. Dendroica æstiva (Gmel.). [93.] *Yellow Warbler.*

After wintering below our southern border this species passes in summer over the whole of the United States and Manitoba, breeding throughout its range. Mr. William Lloyd says that in Tom Green and Concho Counties, Tex., it is more abundant in spring and fall than all the other warblers together. In the spring of 1884 it crossed our border late in March, or early in April, appearing at San Angelo, Tex., April 10. As usual, the migration eastward was considerably in advance of that in the west, and the species was seen at Saint Louis April 19; but at latitude 39° 12′ in Kansas not until April 25. East of Saint Louis the time of arrival was fully as early as at Saint Louis, since Mr. Balmer found the first at Danville, Ill., April 21. May 5 to May 8 seems to have been the period of greatest activity with this species, notes coming these days from northern Illinois, Wisconsin up to latitude 44° 26′ and latitude 44° 30′, the whole of Iowa, the southern edge of Minnesota at 43° 43′, and north to latitude 42° 56′ in Dakota. Its migration certainly did not become slower in the north, for the first was seen May 10 at latitude 45° 25′ in Minnesota, May 11 at latitude 46° 33′ in Minnesota, May 13 at latitude 44° 21′ in Dakota, and May 18 at Portage la Prairie, Manitoba (latitude 50°).

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* Gruntvig, Bull. Nutt. Ornith. Club, Vol. VIII, 1883, pp. 67, 70.

The bulk moved about six or seven days behind the van.

In the fall of 1884 the bulk of Golden Warblers left Williamstown, Iowa, August 1, and the last August 10. At Des Moines, Iowa, the last was reported August 29, and at Mount Carmel, Mo., August 7. The following note was received from Mr. Wm. Lloyd, of San Angelo, Tex.:

> A peculiar flight of Golden Warblers should be mentioned, which occurred here August 15. After being few and far between since May, on the above date they appeared by hundreds all over the country, ranging as far as four miles from water, to the outer limits of the range of the Cañon Finch. I noted in their company on the river the Black-capped Fly-catching Warbler, and the Black and White Creeping Warbler. A similar occurrence took place last year (1883), though about a week earlier. I find recorded in my notes the sudden abundance of the Golden Warbler, about August 10, at a place some sixty miles from here. Already (September 3) they are far less abundant. I hardly know whether to consider that these are early migrants resting on their way south, or just a chance visitation caused by the food supply failing in some other neighborhood.*

It is strange how persistently the Yellow Warbler is confounded with the American Goldfinch by our observers. Fully 10 per cent. of the notes sent in under the name "Yellow Warbler," "Summer Yellow Bird," etc., were found by comparison of dates to belong to the other species. This bird crossed our southern border early in April, appearing at Houma, La., and Bonham, Tex., April 9. At each of these places the species was next seen April 11. At Saint Louis, Mo., the first was seen April 18, after a very unfavorable night for migration. Four days later (April 22) an increase was observed, and April 24 the bulk of males came. The same day they were noted from Mount Carmel, Mo,, and Paris, Ill. The southern edge of Iowa was reached April 25, and latitude 41° in Iowa and Illinois April 29. They arrived at Chicago, Ill., May 9, three days after they had reached points on the Mississippi River, a hundred miles farther north. The last part of the migration seems to have been more rapid than the first. The birds were so delayed by the cold of the early part of May that on May 11 there had been no record of arrival at any point north of latitude 44°, yet by May 16 they had been seen over the rest of Wisconsin, all of Minnesota, central Dakota, and at two stations in Manitoba, up to latitude 50° 30′. More than two hundred were seen at White Earth, Minn., May 16.

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*[Beyond a doubt they were regular migrants.—C. H. M.]

In the fall of 1885 the last left Saint Louis, Mo., August 13, and Bonham, Tex., September 3; and the first migrant reached San Angelo, Tex., August 28.

654. Dendroica cærulescens (Gmel.). [94.] *Black-throated Blue Warbler.*

The movements of this species may be summed up in a few words: It winters from Florida southward, extends west to Texas, Indian Territory, Kansas, and Nebraska, and breeds principally in British America, though a few doubtless nest in northern Minnesota. It reached latitude 40° May 1, latitude 42° May 6, latitude 44° May 10, and was seen at Elk River, Minn., May 23, but probably arrived there a few days earlier. This is one of the birds that is unaccountably rare at Saint Louis, while it is abundant in the surrounding country. At Pierce City, Mo., May 2, it was, next to the Yellow-rump, the most common Warbler.

In the spring of 1885 the first Black-throated Blue Warbler was seen at Saint Louis April 30; at Paris, Ill., May 1; at Milwaukee, Wis., May 5; at Waukon, Iowa, May 14; and at Hastings, Minn., May 19.

In the fall of 1885 it was first seen at Lanesboro, Minn., September 30. At Fernwood, Ill., the first was seen September 6; the bulk left October 11, and the last October 14. An albino was taken at Fernwood during fall migration.

655. Dendroica coronata (Linn.). [95.] *Yellow-rumped Warbler.*

Breeds from northern Minnesota northward, and winters from the middle portion of the Mississippi Valley southward. Dr. J. C. Merrill states that in the Lower Rio Grande Valley in Texas the Yellow-rump "is perhaps the most common of the winter residents, and is found in the greatest abundance from the latter part of October to April. About the latter part of March there is an arrival of males from the south in nearly full breeding plumage." The species winters over an immense area. While it is abundant in southern Texas, and great numbers pass on through Mexico to Central America, as far, even, as Panama, still it is the hardiest of our Warblers, and unnumbered thousands regularly pass the winter in the lower half of the Mississippi Valley. It has been known to endure a temperature of 20° below zero with no apparent inconvenience. With plenty of poison ivy berries to eat, it seems not to care how the mercury stands. Along latitude 39° it generally winters almost everywhere, but the unusually severe weather of the first week in January, in 1884, drove it southward from all but the most favorable localities. About twenty birds remained through January at Saint Louis, and not quite so many at Manhattan, Kans. It was not until the middle of March that the northward movement commenced. This was marked at Caddo, Ind. Ter., by the return of the birds from the bottom lands, whither they had been driven by the cold, to the edges of the prairie. There was scarcely any increase in numbers until April 1. At more northern localities the first wave was marked by the arrival of more birds. This wave reached latitude 39° the last week of March, but was stopped by the heavy snow-storms of the first week in April and made no further advance until the middle of the month. Out of the nineteen records of arrival at stations between latitude 39° and latitude 45° but two mentioned any Yellow-rumps before April 16. But on that and the two following days they appeared in large numbers over the whole of these 200,000 square miles. What an incredible number of Yellow-rumps must have been moving on those three days! The same wave brought the bulk to the region south of latitude 39°, and another two weeks carried it up to latitude 45°, making the species, for the time being, one of the most numerous birds of the Upper Mississippi Valley. Having now passed over the land of spring-time and reached a country still ruled by winter, they checked the hurriedness of their flight and did not reach Portage La Prairie, Manitoba, until the first week in May. A few breed in northern Minnesota, but the bulk pass on to breed in British America. A curious incident occurred in the migration of this species at Heron Lake, in southwestern Minnesota. On March 18 there arrived an immense flight of Ducks, all coming from the west as if from the Missouri Valley. Together with them, or at least on the same day, came great flocks of Blackbirds and "a large flight of Yellow-rumps in fine feather and song." Where they came from is a mystery. A competent observer on the Missouri River southwest of Heron Lake did not find the species common until nearly two months later, and no station south or southeast reported them at all until three weeks later, nor at Heron Lake was the arrival of the bulk noted until thirty-three days afterwards. It would seem to be a case of a flock caught up by some upper-air current and carried farther than they intended. While most of the birds left central Illinois the first week in May, some very late migrants were seen at Whitehall May 21.

In the fall of 1884 the first note of the Yellow-rumped Warbler came from the edge of its breeding-grounds at Elk River, Minn., where the bulk arrived September 9; the bulk left October 8, and the last November 5. The first was noted from Des Moines, Iowa, October 18; the bulk October 21, and the last October 25. At Mount Carmel, Mo., the first was reported September 27; departure of bulk October 22, and last seen November 3. During the winter of 1884–'85 no reports were received of irregular wintering of the Yellow-rumps, except from Manhattan, Kans., where four birds were seen January 24. No more were seen there for three months.

In the spring of 1885 the first migrant was noted at San Antonio, Tex., February 27; at Gainesville, Tex., March 23, and at Saint Louis, Mo., April 8. The remaining notes are too irregular to be systematized. April 16 the bulk reached Saint Louis; April 18 the first came in large numbers to Newton, Iowa, and Lanesboro, Minn. April 3 they appeared at Minneapolis, Minn., and Elk River, Minn., while they did not reach Shell River, Manitoba, till the last day of the month. At Bonham, Tex., the last was seen April 15; at Houma, La., April 20; Pierce City, Mo., May 6; Saint Louis, Mo., May 12; Manhattan, Kans., May 16. Except a single record from Waukon, Iowa, May 19, none were reported from Iowa, Minnesota, or Wisconsin after May 16, and most of the Yellow rumps left these States May 11.

In the fall of 1885 the Yellow-rumped Warbler re-appeared at Elk River, Minn., September 20; at River Falls, Wis., September 29; Lanesboro, Minn., September 29; Iowa City, Iowa, October 1; Fernwood, Ill., October 5; Mount Carmel, Mo., October 4; Saint Louis, Mo., October 5, and Gainesville, Tex., November 13. Thus its record west of the Mississippi River was very regular. The last were seen at Elk River, Minn., October 7; River Falls, Wis., October 13; Lanesboro, Minn., October 18; Iowa City, Iowa, October 12; Fernwood, Ill., October 14; Des Moines, Iowa, October 24; Mount Carmel, Mo., November 11, and on the latter date the last transients were seen at Saint Louis. Their period of greatest abundance at Saint Louis was from October 9 to October 26. Mr. Lloyd gives it as a spring migrant in Tom Green and Concho Counties, Tex., while in southeastern Texas it is an abundant winter resident (Nehrling), as it is at Boerne (Brown).

656. **Dendroica auduboni** (Towns.). [96.] *Audubon's Warbler.*

This Warbler, which is the western representative of the Yellow-rump, migrates along the western border of the district from its winter home in Mexico and southward. Colonel Goss, in his Catalogue of the Birds of Kansas, mentions it as a not uncommon migrant in the western part of that State. In the spring of 1884 it was taken at San Angelo, Tex., May 3. Mr. Lloyd states that it is a tolerably common spring and fall migrant in Tom Green and Concho Counties, Tex., where he has killed it as late as October 20 (1886).

In the spring of 1885 San Angelo, Tex., was the only station that reported the migration of Audubon's Warbler. It was first noticed May 3.

In the fall of 1885 it appeared at San Angelo, October 1. Mr. Lloyd found this species common, November 3, at Fort Davis, Tex.

657. **Dendroica maculosa** (Gmel.). [97.] *Magnolia Warbler; Black and Yellow Warbler.*

This Warbler may breed in northern Minnesota, but no nests have been found, and the bulk crosses the line. It is a rapid migrant. Rushing up the Mississippi Valley in the spring of 1884, from its winter home far south of our border, it appeared at Pierce City, Mo., May 2, and at Elk River, Minn., May 21. This gives an average of thirty-two miles a day. In 1883 its average rate over nearly the same ground was thirty-five miles a day. Mr. Widmann's report from Saint Louis is as follows: "May 5, first, one old male, silent; May 7, bulk of males in song, and first female; May 10, in pairs; May 11, last male; May 17, last female." Thus the entire time occupied by this species in passing Saint Louis was less than two weeks, while the stay of the Yellow-rumped Warbler at the same station was about seven weeks (March 23 to May 10).

In the fall of 1884 the last Black and Yellow Warbler was reported from Des Moines, Iowa, August 26.

In the spring of 1885 no records of its movements were received from the country south of Saint Louis, Mo., at which place the first came May 4. On the same date it was seen at Peoria, Ill., and the next day (May 5) at Iowa City, Iowa, Chicago, Ill., and Milwaukee, Wis. At Lanesboro, Minn., the first was seen May 10; at Heron Lake, Minn., May 14; at Durand, Wis., May 15; and at New Richmond, Wis., May 18. At Saint Louis the bulk was present May 5 to May 14, and both at Saint Louis and at Des Moines, Iowa, the last was seen May 22. This is later than the dates noted at any of the more northern stations.

In the fall of 1885 several appeared at Saint Louis, Mo., September 17, but all left in the course of the next ten days.

In Kansas it is a rare migrant (Goss).

658. Dendroica cærulea (Wils.). [98.] *Cerulean Warbler.*

Little can be said of this Warbler. Though not uncommon in the Mississippi Valley, its habit of keeping in the tops of the tallest trees enables it to pass unnoticed. It leaves the United States in the fall, and in summer is found from the Gulf to Minnesota and west to eastern Kansas and Nebraska. In the spring of 1884 the first arrived at Saint Louis April 14, and the bulk April 26. It was also seen at Burlington, Iowa, May 11, and there the record ends.

In the spring of 1885 the record of the Cerulean Warbler at Saint Louis was as follows:

> April 17 the first was seen; April 17 the bulk of the males arrived at the stands; April 24–27 the bulk of the females arrived, and mating began.

At Hennepin, Ill., the first was seen April 20, and at New Richmond, Wis., May 25. During the middle of October, 1885, Mr. Lloyd met with it in small flocks ("of five to eight") in western Texas.

659. Dendroica pensylvanica (Linn.). [99.] *Chestnut-sided Warbler.*

Breeds throughout Manitoba and the Northern States, south to Iowa and northern and central Illinois. This is another of the well-known Warblers, but it was not noted by any of the southern observers. In the spring of 1884 it was not recorded until May 1, when latitude 39° was reached. The 43d parallel was crossed May 10, and latitude 45° 30′ May 18. So rare is it in the West that it has been taken but twice in

Kansas; although seen quite often in Nebraska, it is not known to nest there. Its stay at Saint Louis was unusually short, lasting only from May 6 to May 15, while in 1883 it arrived April 27 and left May 24.

In the spring of 1885 the Chestnut-sided Warbler was one of the few species seen at Mount Carmel, Mo., before its arrival was noted at Saint Louis. Although Mount Carmel is only a few miles north of Saint Louis, and not many miles west, yet comparison of an extensive series of notes from the two places shows that the arrival of birds at Mount Carmel averages several days later than at Saint Louis. The cause of this is not difficult to determine. The Mississippi River is the great highway of travel for the birds as they come from the south, but when they reach Saint Louis the ranks divide, and those which choose the valley of the Missouri River move for several days in a westerly direction, following the course of the river.* At Pierce City, Mo., another cause operates to make their arrival still later. Of all the stations in the Mississippi Valley, this is almost the only one where the influence of mountains is felt as a factor in the study of migration. The Ozark Mountains stretch to the south of Pierce City, forming a broad and high barrier to the northward progress of migrating birds.† In the case of some of the larger birds and those possessing great power of flight, the retardation due to the mountains is scarcely noticeable, but with the Warblers a marked effect is perceived. Pierce City is about 150 miles farther south than Saint Louis, and yet the average date of the arrival there of fourteen species of Warblers was eleven days later than at Saint Louis. The Chestnut-sided Warbler reached Mount Carmel, Mo., April 23, and Saint Louis, Mo., April 29, and it was recorded May 4 and 5 at Paris, Ill., Chicago, Ill., Grinnell, Iowa, and Ripon, Wis. May 15 and 16 another wave of migration brought it to Waukon, Iowa, Lanesboro, Minn., Lake City, Minn., New Richmond, Wis., and Elk River, Minn. A single bird was seen at White Earth, Minn., May 17. The bulk was present at Saint Louis from May 5 to May 12, and the last departed May 18.

In the fall of 1885 the last was seen at Grinnell, Iowa, September 10. At Saint Louis, Mo., only a single bird was noted during fall migration, and that was seen September 23.

660. Dendroica castanea (Wils.). [100.] *Bay-breasted Warbler.*

Like the Chestnut-sided, this Warbler is an eastern species, which reaches only to the edge of the plains. It has been found in Nebraska, but is not yet known as a bird of Kansas. It winters south and breeds north of the United States, but is common in the Mississippi Valley in spring and fall, and a few are said to breed at Portage la Prairie, Manitoba. Mr. Nehrling states that in southeastern Texas, near Houston, it is

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[* Moreover, the altitude of Mount Carmel is considerably greater than that of Saint Louis.—C. H. M.]

[† Pierce City is in the midst of the Ozark Hills, at an elevation of nearly twelve hundred feet, while Saint Louis is little over 400 feet.—C. H. M.]

one of the commonest Warblers during spring migration. He recorded it as late as May 5. The record shows that in 1884 the species was observed at latitude 37°, May 8; latitude 39°, May 11; and latitude 45°, May 26. Females were seen at Chicago May 23. If the observers knew anything more about the movements of the species they failed to communicate the fact.

In the spring of 1885 the first Bay-breasted Warbler was reported from Pierce City, Mo., May 7; Saint Louis, May 15; Lanesboro, Minn., May 18; and Elk River, Minn., May 20. One was taken at Tampico, Ill., during the spring of 1885.

In the fall of 1885 the first and last was seen at Saint Louis September 25.

661. Dendroica striata (Forst.). [101.] *Black-poll Warbler.*

Breeds north of the United States. Few Warblers perform more extended migrations than the Black-poll. The equator and the Arctic Ocean form the extreme objective points of its periodical movements. The earliest record of its migration in 1884 came from Danville, Ill., where it was noted April 27—two days earlier than it was seen at Saint Louis, nearly a hundred miles farther south. This circumstance taken alone would scarcely call for remark, but in studying migration in this region it is found that more than twenty species were recorded at Danville from two to ten days earlier than at Saint Louis. It is evident, then, that some species migrate earlier in the valleys of the Ohio and Wabash than in the same latitude along the Mississippi, although this latter route is usually considered, and not without reason, as the most favorable in the United States. Stations in extreme eastern Illinois are so few that an extended comparison of dates can not be made, but the records seem to indicate that migration in favorable localities along the eighty-eighth meridian is slightly in advance of that along the Mississippi River and the ninety-first meridian up to about Chicago, where the rate of travel along the two routes seems to be about the same. North of Chicago migration by the western route is in advance. This, however, is mainly surmise, and these opinions may be reversed by future and more extended observations. The subject is mentioned here merely to call attention to its importance in future investigations.

Continuing the record north of Saint Louis, it is found that the Black-poll Warblers arrived at Alda, Nebr., May 3; at Iowa City, Iowa, May 17; Polo, Ill., May 19; and Lanesboro and Heron Lake, in Minnesota, and West De Pere, Wis., May 20 and May 21. The bulk came to Saint Louis May 7 and stayed six days; to Manhattan, Kans., May 13, and remained but two days. Irregular and very early dates are May 5 at latitude 42° 18′ in Iowa; May 1 at latitude 44° 32′ in Minnesota; May 4 at latitude 44° 45′ in Wisconsin; and May 18 at latitude 45° 25′ in Minnesota.

In the spring of 1885 the Black-poll Warbler arrived at Saint Louis, Mo., April 29, several days earlier than it appeared at stations in the same latitude farther east and west. At Paris, Ill., none were reported until May 4, nor at Manhattan, Kans., before May 12. One was seen at Des Moines, Iowa, May 5. Like many other Warblers, the Black-poll made a great advance from May 14 to May 16. Between these dates it was reported from Waukon, Iowa; Lanesboro, Minn., Elk River, Minn., and even from White Earth, Minn., where as many as seventy-five were seen May 16. At Saint Louis the bulk arrived May 5; bulk left May 16, and the last one (a female) was seen May 22. It was not seen after May 20 at any other station from southern Missouri to southern Minnesota.

In the fall of 1885 the arrival of the Black-poll at Saint Louis, Mo., September 21, was the only note received concerning its migration.

662. Dendroica blackburniæ (Gmel.). [102.] *Blackburnian Warbler.*

Few lovers of forests and birds could fail to notice this brilliantly colored Warbler should they pass near its favorite haunts. It breeds from the heavy forests of northern Minnesota northward, and winters south of our southern border. Like the Chestnut-sided, it is rarely found so far west as Kansas and Nebraska. It is one of the few Warblers of whose entrance into the United States we have a record. In the spring of 1884 it appeared at Rodney, Miss., April 13; advanced to latitude 37° May 2; latitude 39° May 10; latitude 43° May 16; and the most northern record contributed was latitude 45° May 23. This gives an average of 23 miles a day for nearly a thousand miles.

In the spring of 1885 the first Blackburnian Warbler was reported from Pierce City, Mo., May 7; from Saint Louis, Mo., and Hennepin, Ill., May 12; from Lanesboro, Minn., May 16; and from Heron Lake, Minn., May 19. None were seen at Saint Louis after May 13.

In the fall of 1885 the first was seen at Saint Louis September 19, and the last September 25.

663 a. Dendroica dominica albilora Baird. [103*a*.] *Sycamore Warbler; White-browed Yellow-throated Warbler.*

This form of the Yellow-throated Warbler is restricted to the southern portion of the Mississippi Valley, extending up to southern Indiana, southern Illinois, and Kansas. Evidently it does not breed in the Lower Rio Grande Valley in Texas, for Dr. Merrill says of it there: "One of the first migrants to return in the autumn, when it is not rare. A few pass the winter." It is one of the earliest migrants among the Warblers, and in the spring of 1884 was reported from Saint Louis April 4, and from Gainesville, Tex., April 7, showing how much later these insect-eating birds move on the plains than farther east. It was noted at Saint Louis that singing suddenly ceased April 30 and was recommenced with great diligence May 31.

In the spring of 1885, at Gainesville, Tex., the first Sycamore Warbler was seen March 22; the next April 9, and the bulk April 17. At

Saint Louis a pair was observed April 6. From April 6 to April 17 these Warblers were conspicuous songsters. May 1 they were almost silent.

In the fall of 1885, at Saint Louis, they had all left their summer stands by October 7, and none were seen later than October 11.

666. Dendroica chrysoparia Scl. & Salv. [106.] *Golden-cheeked Warbler.*

A tropical and subtropical species, ranging from central Texas to Guatemala. The first known specimen from the United States was killed near San Antonio, Tex., about 1864, by Mr. Dresser. In April, 1878, it was taken in Bosque County, Tex., by Mr. G. H. Ragsdale (Bull. Nutt. Ornithological Club, Vol. IV, 1879, p. 60). During the same month (April, 1878) Mr. W. H. Werner found it to be a tolerably common Warbler in parts of Comal County, where four nests were discovered in May (Ibid., pp. 77–79). In March, 1880, Mr. N. C. Brown captured seven specimens at Boerne, Kendall County, where the species was first seen March 12 (*Ibid.*, Vol. VII, 1882, pp. 36, 37); and in the spring of 1883 he secured three more in the same locality (The Auk, Vol. I, 1884, p. 121). Recently Mr. Lloyd, in his list of the birds of Tom Green and Concho Counties, Tex., says of it: "One was shot in a hackberry in April, 1887. Its stomach contained winged ants." (The Auk, Vol. IV, 1887, p. 296.)

667. Dendroica virens (Gmel.). [107.] *Black-throated Green Warbler.*

Breeds from northern Illinois northward, and leaves the United States entirely in winter. In southeastern Texas it is abundant during the migrations (Nehrling). The first note for 1884 came from Saint Louis, where it arrived April 26. May 1 it was noted at Danville, Ill. By May 7 it had reached Minneapolis, Minn., and May 10 it was observed at West De Pere, Wis. In the West it extends to the eastern boundaries of Nebraska, Kansas, Indian Territory, and Texas, but was not reported in 1884 from any of these States.

In the spring of 1885 the records indicate a very rapid migration. Seven days after the first came to Saint Louis, Mo., April 30, they had appeared at Paris, Ill.; Des Moines, Iowa; Lanesboro, Minn., and Elk River, Minn. This would give an average rate of about 70 miles a day. The bulk was present at Saint Louis, Mo., from May 5 until May 15, when they suddenly disappeared. Some late records were sent in. It was reported May 21 at San Antonio, Tex., and June 5 at Des Moines, Iowa.

In the fall of 1885 this Warbler was found migrating through San Angelo, Tex., August 25; and Mr. Lloyd states that in Tom Green and Concho Counties, Tex., it is a common fall migrant from August 1 to September 20. This fact makes it almost certain that it will be found to breed occasionally in the middle portion of the Rocky Mountains. At Saint Louis, Mo., the first came September 17, and the last disappeared October 5.

668. Dendroica townsendi (Nutt.). [108.] *Townsend's Warbler.*

No specimen of this species had been taken in the Mississippi Valley until Mr. Lloyd secured it at San Angelo, Tex. It winters beyond our limits, and ranges in summer through the Rocky Mountains, even to Alaska. It is a summer resident in Tom Green County, Tex., though Mr. Lloyd says that it is rarely secured, as it is found only in the thickest underbrush of a very restricted area. Its nest and eggs are unknown.

In the fall of 1884 Townsend's Warbler first appeared at San Angelo, Tex., September 21, and was last seen there September 26.

In the spring of 1885 the first was seen at San Angelo, May 8.

670. Dendroica kirtlandi Baird. [110.] *Kirtland's Warbler.*

The honor of adding this exceedingly rare Warbler to our district belongs to Mr. Widmann, who captured a specimen at Saint Louis, Mo., May 8, 1885.* It is an eastern species and has been taken at various places from Ohio southward.†

671. Dendroica vigorsii (Aud.). [111.] *Pine-creeping Warbler.*

A hardy Warbler, sometimes wintering as far north as southern Illinois, and one of the few which remain in large numbers in the United States through the winter. It breeds throughout its range, but at very different dates. Those which breed in the Southern States begin nesting in March, while those nesting in Manitoba (where, apparently, it is rare) hardly get their housekeeping affairs arranged before the latter part of June. In Kansas it is rare (Goss). Migration usually begins in March, but it must have been delayed in 1884, as the birds all came at once. All the notes from latitude 37° to latitude 45° were made in the first week in May. Information is much desired concerning the breeding habits of this species in Wisconsin, Minnesota, Kansas, and Nebraska.

In the spring of 1885, at Saint Louis, the first and only Pine-creeping Warbler seen was noted April 24. At Hennepin, Ill., the first was seen April 30, and the next May 1. It first reached Lanesboro, Minn., May 7. Mr. Thomas Miller has taken it at Heron Lake, Minn., and Roberts and Benner killed a female in Grant County, Minn., in June, 1879. Mr. F. L. Grundtvig found it tolerably common in migration at Shiocton, Wis., during the first half of May, 1882.

672. Dendroica palmarum (Gmel.). [113.] *Red-poll Warbler.*

From its winter home in the Southern States and southward, this Warbler migrates through the Mississippi Valley, to breed in the far north. In the spring of 1884 it reached Saint Louis April 18, and Danville, Ill., April 21. No farther advance was recorded until April 27 and April 28, when it was noted all over Iowa, Illinois, and Minnesota up to latitude 43° 43′. Two days later it had reached latitude 44° 32′, Minnesota, and May 3 was reported from Elk River, Minn. (lat. 45° 25′). In the east it was a trifle slower, not being noted at West De Pere, Wis. (lat. 44° 26′), until May 6. The last one left Saint Louis May 9.

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* Bull. Nutt. Ornith. Club, Vol. II, October, 1885, p. 382.

[† On the night of May 21, 1885, a male Kirtland's Warbler killed itself by striking the light-house at Spectacle Reef, in the west end of Lake Huron, near the Straits of Mackinac. (See The Auk, Vol. II, 1885, p. 376.) Mr. Ridgway records another specimen, a male, which was killed at Battle Creek, Mich., May 11, 1883. (The Auk, Vol. I, 1884, p. 389.)—C. H. M.]

In the fall of 1884, at Elk River, Minn., the first and bulk of Redpoll Warblers appeared September 21, and the last was seen October 1.

In the spring of 1885 the records of its migration were not very regular. After the first had been seen at Saint Louis, Mo., the next records were from Rockford, Ill., and Durand, Wis., where it was reported April 26. During the last three days of April it appeared at Des Moines, Iowa, Coralville, Iowa, Chicago, Ill., Waukon, Iowa, and Lanesboro, Minn. May 4 it arrived at Elk River, Minn., and May 5 at New Richmond, Wis. At Saint Louis the bulk was present April 22 to April 29, and the last was noted May 12. At Waukon, Iowa, the last was seen May 13; at Rockford, Ill., May 16; and at Lanesboro, Minn., May 18. At White Earth, Minn., it was very abundant May 16.

In the fall of 1885 the first came to Elk River, Minn., September 28, and to Lanesboro, Minn., September 30. None were seen at Elk River, Minn., after September 28; at Lanesboro, Minn., after October 2; nor at Saint Louis, Mo., after October 26. In Kansas it is a rare migrant (Goss).

672 a. Dendroica palmarum hypochrysea Ridgw. [113 *a*.] *Yellow Palm Warbler.*

This is the eastern representative of the foregoing. It breeds in the Atlantic coast region from New Brunswick and Nova Scotia to Hudson Bay, and winters in the South Atlantic and Gulf States as far west as Louisiana.

673. Dendroica discolor (Vieill.). [114.] *Prairie Warbler.*

The Prairie Warbler winters in Florida and the West Indies, proceeds up the Mississippi Valley to Illinois (and accidentally to Wisconsin), and extends west to eastern Kansas and eastern Nebraska. It is not yet known from Minnesota, though it has been taken by Dr. King at West Liberty, Iowa. In the spring of 1884 it was observed at one station only, namely, Pierce City, Mo., where it arrived April 27. It is quite rare in all the northern portions of its range.

674. Seiurus aurocapillus (Linn.). [115]. *Ovenbird; Golden-crowned Thrush.*

The Ovenbird is an inhabitant of the eastern United States, ranging westward to the eastern foot-hills of the Rocky Mountains. It breeds throughout Manitoba and the northern half of the Mississippi Valley. It breeds abundantly in central and western Dakota, and in Kansas it is a common summer resident. This is rather an early migrant for a Warbler. In the spring of 1884 its record was so thoroughly mixed that we can only surmise that it reached latitude 37° in the early part of April, and latitude 39° the middle of the month. In Minnesota it appeared at Lanesboro April 26, Red Wing April 29, and was recorded from Elk River May 10, but probably arrived there a few days previously. The bulk reached Pierce City, Mo., April 19, where it was very numerous, migrating in flocks. Passing on, the bulk reached latitude 39° about April 26, and latitude 45° May 12.

In the fall of 1884 only one station reported the migration of the Ovenbird. The bulk left Mount Carmel, Mo., September 1, and the last September 21.

In the spring of 1885 it reached Saint Louis, Mo., April 17, and the bulk came three days later. Then there was no regularity in the records until May 5, when it was reported from Chicago; May 6 it reached northeastern Iowa and Minnesota up to Elk River, and May 7 it attained corresponding latitudes in eastern Wisconsin. At Manhattan, Kans., the first was reported May 5.

In the fall of 1885 the first migrant reached Fernwood, Ill., September 8, where it was last seen two days later. The last was seen at Grinnell, Iowa, September 16. At Saint Louis, Mo., it was very numerous September 17. The bulk had left Saint Louis by September 26, and the last followed September 29. In Concho County, Tex., Mr. Lloyd shot one and saw another September 10, 1886.

675. Seiurus noveboracensis (Gmel.). [116.] *Water-Thrush.*

A bird of eastern North America; probably does not occur west of the Mississippi River. It winters in the Southern States, occasionally as far north as southern Illinois, and breeds from northern Illinois northward. The records of its migration are too uncertain to be used.

675*a*. Seiurus noveboracensis notabilis (Grinn.). [116*a*.] *Grinnell's Water-Thrush.*

Takes the place of the foregoing in the region west of the Mississippi River. Occurs from Illinois westward to California and north into British America; winters from the southern border of the United States southward to northern South America, and breeds from northern Kansas northward. Some uncertainty attaches to the records of its migrations.

In the spring of 1884 the most reliable notes received are the following: Latitude 38° 40′ in Missouri was reached April 26; latitude 41° 38′ in Iowa May 3; latitude 41° 40′ in Iowa April 30; latitude 43° 15′ in Iowa April 27; latitude 43° 48′ April 29. It was reported also from latitude 43° 43′ in Wisconsin April 28, but this record may refer to the typical form. These scanty notes seem to indicate that the species spread all at once over the country between latitude 38° 40′ and latitude 43° 50′. On May 12 the last left Saint Louis, but one was seen at Ellis, Kans., as late as May 25.

In the spring of 1885 the first Water Thrush came to Saint Louis, Mo., April 27; to Fayette, Mo., May 1; Hennepin, Ill., May 2; Lanesboro, Minn., May 7; Manhattan, Kans., May 14; Heron Lake, Minn., May 15, and White Earth, Minn., May 16. The bulk reached Saint Louis, Mo., April 30, departed May 12, was followed by the last May 15.

In the fall of 1885 the first returned to Saint Louis, Mo., September 17, and the species was present there just one month.

676. **Seiurus motacilla** (Vieill.). [117.] *Louisiana Water-Thrush; Large-billed Water-Thrush.*

Essentially a southern bird; rarely found north of latitude 42°. It winters below the United States, and while abundant in the southern part of its range is quite rare in the northern. It is quite common in Kansas and occurs at Newton, Iowa, but is rare in Nebraska, and there is no record of its occurrence in Minnesota. In 1884 the first reached Saint Louis March 29 and it was seen again April 4; the bulk came April 18. At Chicago the first was seen April 19, though it may have come sooner. On the plains the birds were later. They were heard at Gainesville, Tex., April 15, and a single one was seen at Manhattan, Kans., April 18, but no more until the bulk arrived, April 26.

In the spring of 1885 the Large-billed Water Thrush first appeared at Gainesville, Tex., March 24; and at Saint Louis, Mo., April 6. It was reported from Mount Carmel, Mo., April 18; from Manhattan, Kans., April 15; and from Des Moines, Iowa, April 18. It arrived at Waukon, Iowa, April 21, and Lanesboro, Minn., April 28. At Heron Lake, Minn., only a few miles farther north than the last, but in the western part of the State, none were seen till May 11. It became common at Manhattan April 18; Des Moines, April 24; Waukon, May 8; and at Heron Lake, May 16. Thus it will be seen that this species has been added to the list of Minnesota birds. At both Lanesboro and Heron Lake all three of the Water Thrushes were found in the spring of 1885. In the fall of 1885 the last left Saint Louis September 29.

677. **Geothlypis formosa** (Wils.). [119.] *Kentucky Warbler.*

The Lower Mississippi Valley is the special home of this species, and it is more abundant there, particularly in southern Indiana, southern Illinois, and southeastern Texas, than in any other part of the United States. In Kansas it is a common summer resident (Goss.). In 1884 the earliest record came from Gainesville, Tex., where it arrived April 15. Both in Kansas and Missouri it reached latitude 39° the last of April. At Saint Louis the first arrived April 28, and the bulk April 30; at Manhattan, Kans., the first came April 30, and it was seen daily after May 1. At Pierce City, Mo., it was common by May 3. May 11 it had reached almost the limit of its northward advance at Burlington, Iowa, though it has been found accidentally in Wisconsin. It has not yet been seen in Minnesota. The species winters outside our limits and breeds throughout its range.

In the spring of 1885 the first Kentucky Warblers came to Gainesville, Tex., April 9, and were common there by April 17. At Saint Louis the first arrived April 21, the bulk April 27, and they were numerous May 4. At Manhattan, Kans., the first were seen May 1.

In the fall of 1885 the last left Bonham, Tex., August 20.

678. Geothlypis agilis (Wils.). [118.] *Connecticut Warbler.*

This is one of the rarest, and hence one of the most interesting Warblers of the Mississippi Valley. In 1883 neither the breeding range nor its winter range was known. In 1884 something was learned of its summer home, but where it spends the winter is still a mystery. The question of its nest and eggs has been answered by Mr. Ernest E. T. Seton (now Ernest E. Thompson), who found a nest on a moss mound in a tamarack swamp near Carberry, Manitoba, concerning which he published an interesting account in the Auk for April, 1884, page 192.

He afterwards stated that this nest was found June 21, 1883. Not the least interesting fact in the life history of this little-known species is its choice of different routes for its spring and fall migrations, passing northward along the Mississippi Valley and returning by way of New England. It is almost the latest Warbler to migrate in spring, coming some time after the Black-polls, which are usually believed to bring up the rear of the Warbler hosts. The only observer who noted it in 1884 was Mr. Widmann, who found it at Saint Louis May 21, at the same spot as in 1882 and 1883. As the birds do not leave latitude 43° until about June 1, it must be very late before they reach their breeding-grounds in Manitoba.

In the spring of 1885 the first Connecticut Warbler was seen at Saint Louis, Mo., May 15, and the last one week later.

679. Geothlypis philadelphia (Wils.). [120.] *Mourning Warbler.*

In much of the Mississippi Valley the Mourning Warbler is a companion of the Connecticut Warbler in migration, and hardly less difficult to observe. Its life history, however, is well known. It winters south of our border and breeds from Minnesota and eastern Nebraska northward. It is common in western Manitoba. It has been found nesting in Illinois, even south of latitude 39°. In 1884 it was noted by none of the southern observers, the first record being that of its arrival at Saint Louis May 21. During the next week it was observed at Elk River, Minn. At Lanesboro, Minn., May 25, a male was taken with most of its breast black.

In the spring of 1885 Texas was well represented in the records of the Mourning Warbler. It was seen at San Antonio, April 28; at Bonham, May 14, and at Gainesville at the very late date of May 22. It reached Saint Louis, May 13; Emporia, Kans., May 15; Des Moines, Iowa, May 15; Lanesboro, Minn., May 18; Elk River, Minn., May 16, and White Earth, Minn., May 18. Thus it will be seen that in the northern portion of its range it is a very rapid migrant. The last at both Saint Louis and Des Moines was noted May 22.

In Concho County, Tex., it is a tolerably common fall migrant, but has not been seen later than September 1 (Lloyd).

680. Geothlypis macgillivrayi (Aud.). [121.] *Macgillivray's Warbler.*

Along the extreme western edge of the Mississippi Valley this Warbler takes the place of the preceding. An exceptionally eastern record was its occurrence at Gainesville, Tex., where it was taken May 16, 1884. Mr. Lloyd says it is abundant in Texas from Castle Hill to Pecos River, and probably breeds. It has not been reported from any other part of the district, but was taken in Dakota years ago by J. A. Allen. In the fall of 1884 another specimen was secured at Gainesville, Tex., September 3.

681. **Geothlypis trichas** (Linn.). [122.] *Maryland Yellow-throat.*

The typical eastern Maryland Yellow-throat barely reaches the eastern border of the Mississippi Valley, where the prevailing form is intermediate between it and the western.

681a. **Geothlypis trichas occidentalis** Brewst. [—.] *Western Maryland Yellow-throat.*

This lately-described subspecies is the common Maryland Yellow-throat of the western part of the Mississippi Valley from western Manitoba to middle Texas. Throughout the middle and eastern portion of the Mississippi Valley the prevailing form is intermediate between it and typical *trichas*, but, as Mr. Ridgway tells me, is nearer *occidentalis* than *trichas*. Hence all the records relating to Maryland Yellow-throats have been brought under the present subspecies.

From its winter home in the Southern States and southward this Warbler began its pilgrimage in the spring of 1884 early in March. By March 13 it had appeared at Gainesville, Tex., but nothing more was heard of it until April 18, when it arrived at Saint Louis. April 27 found it at Danville, Ill., and April 30 was a day of great migration in Iowa, where it was reported from latitude 41° 38′, latitude 41° 40′, and latitude 43° 15′; May 2 it had advanced to latitude 43° 43′ in Minnesota; May 10 to latitude 45° 25′; and May 26 it had penetrated even to Oak Point, Manitoba. The bulk was found eight to twelve days in the rear of the advance.

In the fall of 1884 the bulk of Maryland Yellow-throats was reported as leaving Williamstown, Iowa, August 22, and the last six days later. At Des Moines, Iowa, the last was reported August 11. At Mount Carmel, Mo., the last one left September 22.

In the spring of 1885 the earliest note came from San Angelo, Tex., where the first was seen April 4, and the species was common the next day. April 20 it appeared at Saint Louis, Mo., and Odin, Ill. April 21 one was noted from Paris, Ill. During the three days from April 23 to April 25 Maryland Yellow-throats were seen at Emporia, Kans.; Iowa City, Iowa; Newton, Iowa; Grinnell, Iowa; and Hennepin, Ill. May 3 found them at Unadilla, Nebr., and a further advance (May 8 and 9) brought them to Huron, Dak.; Coralville, Iowa; La Porte City, Iowa; Waukon, Iowa; and Lanesboro, Minn. The next advance occurred May 14, bringing them to Delavan, Wis.; River Falls, Wis.; Heron Lake, Minn.; and Elk River, Minn. May 16 one was seen at White Earth, Minn. The bulk came to Saint Louis April 24, and the species was most abundant there April 27.

In the fall of 1885 the last migrant left Elk River, Minn., September 24. At Grinnell, Iowa, the last was seen September 26, and at Mount Carmel, Mo., September 27. They were numerous at Saint Louis, Mo., September 16, but the bulk had departed before September 26. The last was noted September 29. A very late migrant was seen at Lanesboro, Minn., October 3.

683. **Icteria virens** (Linn.). [123.] *Yellow-breasted Chat.*

A summer resident in all but the northern part of the Mississippi Valley, east of the plains.

Wintering beyond our southern border, it entered the district in the spring of 1884 about the 1st of March. March 15 it was reported from Gainesville, Tex., and April 25 from Manhattan, Kans. The next day found it at Saint Louis, Mo., but while the bulk was reported as arriving at that place April 29, the bulk was not recorded from Manhattan, Kans., until May 10. This day, May 10, seems to have been the day of special movement for the Chat, as on that day it was noted from latitude 41° 40′ in Iowa; latitude 42° 18′ Iowa; and latitude 40° 08′ in Illinois. It has been reported in past years from southeastern Dakota and southwestern Minnesota, but in 1884 the most northern notes were from central Nebraska and central Iowa. Thus, contrary to the usual rule, it reached Manhattan, Kans., before it did Saint Louis, Mo.; and, furthermore, the dates from Illinois were later than those from Missouri and Iowa. For example, for latitude 39° 19′ in Illinois, the date is May 7; for latitude 40° 08′ in Illinois, May 10; for latitude 42° 16′ in Illinois, May 13. These observations, coupled with the fact that the species is not known to winter in the West Indies, though found in Central America and Mexico, would make it probable that most of the individuals enter the United States through Mexico, and that the migration is in a northeasterly direction.

In the spring of 1885 the earliest record of the Yellow-breasted Chat came from the extreme southwest, where it was seen at San Antonio, Tex., April 14. It reached Gainesville and Bonham, in northern Texas, April 17 and April 18. At Saint Louis, Mo., Chats were seen April 21; at Manhattan, Kans., April 22; at Mount Carmel, Mo., April 30; Corinth, Miss., April 30; Newton, Iowa, April 30; Fayette, Mo., May 1; Des Moines, Iowa, May 11; Huron, Dak., May 12; and Grinnell, Iowa, May 18. Thus the record in 1885 was not so regular as in the previous year.

In the fall of 1885 the last Chats at Grinnell, Iowa, and Mount Carmel, Mo., were seen July 20. At Saint Louis, Mo., they remained until August 18. But none were seen at Bonham, Tex., after August 6. Mr. Lloyd says it is a tolerably common spring migrant in Tom Green and Concho Counties, Tex.

683 a. **Icteria virens longicauda** (Lawr.). [123 a.] *Long-tailed Chat.*

The habitat of this Chat touches the western part of our district along the edge of the plains. Colonel Goss has found it breeding in western

Kansas. In the spring of 1884 it was found at San Angelo, Tex., May 12. Mr. Lloyd says it is an abundant breeder in Tom Green and Concho Counties, Tex.

In the fall of 1884 the last was heard at San Angelo September 27.

In the spring of 1885 it first arrived at San Angelo April 16, and had become common there by the 20th. A nest with four eggs was taken May 5.

In the fall of 1885 it was leaving San Angelo September 16.

684. **Sylvania mitrata** (Gmel.). [124.] *Hooded Warbler.*

A Southern bird, scarcely noticed by the observers. Winters south of the United States, and passes up the Mississippi Valley to breed. Has been taken in Wisconsin, Iowa, eastern Kansas, and southern Nebraska. It breeds in eastern Kansas, but is rare (Goss). Mr. Nehrling thinks it does not breed in southeastern Texas, where it is a common migrant. The record from Saint Louis is: "April 24, first, one male in song; April 30, several males in song; May 9, one of the noisiest birds in the woods; May 21, sitting on eggs already incubated." May 3 it was quite common at Pierce City, Mo.

In the spring of 1885, at Corinth, Miss., the first migrant was seen April 8; and it had become common by April 15. At Saint Louis, the record was: "April 24, first, two males; April 27, bulk arrived; April 30, height of migrating season, and mating began." In the fall of 1885 the last left Saint Louis September 29.

685. **Sylvania pusilla** (Wils.). [125.] *Wilson's Warbler; Black-capped Yellow Warbler.*

This is almost the only Warbler which is found over the whole of the United States. Dr. Coues tells us that the bulk pass through the United States by way of the Rocky Mountains, but there are enough left to make it a common bird in the Mississippi Valley and most of Manitoba. It does not winter in the United States, and Minnesota is the only State of our district in which it has been found breeding. In southeastern Texas it is a very common migrant (Nehrling; Merrill). In the spring of 1884 it reached latitude 40° May 1; latitude 43° May 10; and latitude 45° May 20. In the West it was taken at San Angelo, Tex., May 5. The last one left Saint Louis May 17.

In the fall of 1884 the last Black-capped Yellow Warbler was seen at Williamstown, Iowa, August 23. At San Angelo, Tex., it was last reported September 27. The first reached Gainesville, Tex., September 3.

In the spring of 1885 the earliest record came from San Angelo, Tex., where it was seen April 16. It reached Saint Louis April 29; Paris, Ill., May 5; Des Moines, Iowa, May 6; Lanesboro, Minn., May 7; and Rochester, Minn., May 8. May 16 it was seen at Heron Lake, Minn., River Falls, Wis., Elk River, Minn., and White Earth, Minn. At this latter place about sixty were seen. At Saint Louis the bulk was present from May 5 to May 9, and the last was seen May 22, which is a later date than that given at any other station.

In the fall of 1885 the first reappeared at Saint Louis, Mo., September 3; they were scarce September 17, and the last left September 22. Mr. Lloyd says it is an abundant migrant "all over western Texas from April 2 to May 15, and from September 3 to 30."

686. **Sylvania canadensis** (Linn.). [127.] *Canadian Warbler.*

This handsome Warbler is less common in the Mississippi Valley and Manitoba than farther east. It does not winter in the United States, but breeds sparingly in the Northern States, and abundantly in Canada. It has been known to breed in northern Illinois. It extends westward only to the eastern edge of Kansas and Nebraska. It occurs in southeastern Texas in migration, but is not common (Nehrling). In the spring of 1884 it arrived at latitude 37° April 29, latitude 39° May 11, and at Lanesboro, Minn. (lat. 43° 43′) May 24. The last was seen at Saint Louis May 21.

In the spring of 1885, at Saint Louis, the first was seen May 11, the bulk was present from May 13 to May 19, and the last left May 22. At Lanesboro, Minn., the first was reported May 15, and at Elk River, Minn., May 16. In Wisconsin, it was first reported from Durand May 15; and from New Richmond, May 19.

In the fall of 1885 the first returning migrant was seen at Saint Louis September 22; while at San Angelo, Tex., one was shot from a flock of six August 28.

687. **Setophaga ruticilla** (Linn.). [128.] *American Redstart.*

The Redstart is a common summer resident of the upper half of the Mississippi Valley and Manitoba. As far south as Kansas it is a common breeder. It does not remain in the United States during the winter, nor does it cross our boundary before the first of April. In the spring of 1884 the first record came from Saint Louis April 17, and the next, from latitude 40° 08′ in Illinois, April 27. The last day of the month it was seen at latitude 39° 12′ in Kansas. For the first week of May there was not a record; May 8 it reached latitude 41° 36′ in Iowa; and May 10, 11, and 12, it spread abundantly over the immense district from latitude 41° to latitude 45° 25′. By May 28 it had crossed our northern border and arrived at Portage la Prairie, Manitoba (lat. 50°).

The great changes and diversity in plumage in this species enable the observant ornithologist to note very fully the arrival of the different ages and sexes. Thus at Saint Louis the following record was made by Mr. Widmann:

> April 17, first old males; April 26, bulk of old males; April 30, first females; May 7, height of transient old males; May 9, height of transient females; May 11, first one-year-old male; May 16, young males more conspicuous than old males.

This is one of the species in which the period of arrival at any locality extends over several weeks, the bulk coming many days behind the first. Hence, all notes of first and bulk on the same day are self-evident mistakes. The bulk never arrives till a week after the first, and ten to twelve days is the ordinary time.

In the fall of 1884 the last Redstart was seen at Mount Carmel, Mo., September 11.

In the spring of 1885 Redstarts were reported from San Antonio, Tex., April 28; Gainesville, Tex., May 8; Emporia, Kans., May 11; and Manhattan, Kans., April 22. So much for the regularity of its Western record. The rest of the notes were scarcely more regular. At Reeds, Mo., the first was seen April 4; at Saint Louis, Mo., April 20 (with the bulk of males and first female April 27); Paris, Ill., April 28; southern Iowa, and Chicago, Ill., May 5. The rest of the timbered portion of the district to latitude 45° was reached May 14 and May 15; and May 18 one was seen at White Earth, Minn. Such are the outlines, but the details are not arrangeable.

In the fall of 1885, at Grinnell, Iowa, the last Redstart was seen September 28; at Mount Carmel, Mo., September 20; and at Saint Louis, Mo., where they had been numerous September 17, the last was seen September 29. The first migrant reached San Angelo, Tex., September 11. In Concho County, Tex., it is an abundant fall migrant.

688. **Setophaga picta** Swains. [129.] *Painted Redstart.*

An inhabitant of the highlands of Mexico, coming north to our southern border in Texas, New Mexico, and Arizona.

689. **Setophaga miniata** Swains. [130.] *Red-bellied Redstart.*

Another inhabitant of the highlands of Mexico, coming north to southern Texas (Giraud).

690. **Cardellina rubrifrons** (Giraud). [131.] *Red-faced Warbler.*

The home of this bird is in the highlands of Gautemala and Mexico, extending northward to our southern border in Texas and Arizona.

691. **Ergaticus ruber** (Swains.). [132.] *Red Warbler.*

Inhabits the highlands of eastern Mexico and thence north to Texas (Giraud).

692. **Basileuterus culicivorus** (Licht.). [133.] *Brasher's Warbler.*

Another tropical species, coming north to southern Texas (Giraud).

693. **Basileuterus belli** (Giraud). [134.] *Bell's Warbler.*

Like the last, a Mexican species, recorded from Texas by Giraud.

697. **Anthus pensilvanicus** (Lath.). [71.] *American Pipit; Titlark.*

Breeds in the far north, migrates through Manitoba and the Mississippi Valley and winters from the Southern States southward, sometimes north to southern Illinois. In southeastern Texas it is an abundant winter resident. Although this bird is found over the whole of North America, all the 1884 notes concerning it came from the region west of the Mississippi. In the spring of 1884 it arrived at Gainesville, Tex., March 12; Manhattan, Kans. (where it was common for about a week), April 13; Vermillion, Dak., April 24; and Elk River, Minn., May 4. At Ellis, Kans., the first were taken May 2.

In the fall of 1884 the Titlark was first seen at Gainesville, Tex., November 1.

In the spring of 1885 the first migrant was seen at Gainesville March 10; at Manhattan, Kans., April 15; at Des Moines, Iowa, April 18; and at Elk River, Minn., May 6.

In the fall of 1885 it was first seen at Gainesville November 13; and a flock was seen there November 18. Mr. Lloyd states that in western Texas it is "common in fall migration; less common in spring."

700. **Anthus spragueii** (Aud.). [73.] *Sprague's Titlark.*

Breeds abundantly in the Assinaboine region, and in Dakota and western Minnesota. Since Dr. Coues, in his "Birds of the Northwest," queried whether Sprague's Lark left Dakota for the winter, much has been learned of its movements. We now know that its winter haunts lie far from Dakota, and that it penetrates even to the south of southwestern Texas. Just where it winters seems not yet determined, but as the record now stands it appears to winter below the United States.* Mr. Nehrling found it in small flocks near Houston, Tex., in early November, but it soon disappeared. Mr. Nathan Clifford Brown did not find it at Boerne, near San Antonio, Tex., until March 16, so that its winter home must be south of these points. At Gainesville, Tex., it was seen as late as May 7. While northern Dakota and western Manitoba constitute its special breeding grounds, where it nests in great numbers, yet it can be found in summer in western Minnesota, in Nebraska (where it arrives about the middle of May), and probably also in western Kansas. Colonel Goss says of it in his List of the Birds of Kansas: "Migratory, rare"; but Dr. Watson writes from Ellis, Kans.:

> I am in doubt how to classify this bird, but I think it is a summer resident. During what should be its breeding season I have seen birds ascend almost to invisibility, but lost sight of them in the descent, and they were not captured.

As the soaring he describes is confined to the breeding season, the birds he saw probably had nests in the vicinity.

In Tom Green County, Tex., on the edge of the plains, one was shot in January, 1885. In the spring of 1885 Sprague's Titlark, or Pipit, was first seen at San Antonio, Tex., February 26. At Gainesville, Tex., the first was seen April 8 and the last May 6.

In the fall of 1885 the first was seen at Gainesville October 12, and the next November 2. In Concho County, Tex., a small flock was seen October 15, 1886 (Lloyd).

701. **Cinclus mexicanus** Swains. [19.] *American Dipper;* Water Ouzel.

The home of the Water Ouzel, or Dipper, is along the mountain streams of western North America. According to Professor Aughey it is "rare over most of Nebraska, but abundant in Oteo County;" and Grinnell has recorded it from the Black Hills of Dakota.

[*It has been recorded as wintering in immense flocks in central Arkansas, in company with Lapland Longspurs (Coues, Bull. Nutt. Ornith. Club, Vol. IV, 1879, p. 238). —C. H. M.]

702. Oroscoptes montanus (Towns.). [10.] *Sage Thrasher.*

This is scarcely a bird of the Mississippi Valley, since, as its name implies, its favorite home is in the sage-covered plains of the Great Basin. It is introduced here on account of its occurrence in western Texas, where Mr. Lloyd, at San Angelo, found it an occasional visitant. The species is also migratory, passing north along the Rocky Mountains, about to the northern boundary of the United States.

In the spring of 1885 the first Sage Thrashers (about 20 in number) were reported from San Angelo, Tex., April 1; and the last the next day. They were said to be common there during migration. Recently Mr. Lloyd has published the following concerning the distribution of this species in Texas: "Tolerably common resident in Tom Green County. Winters in Concho County as far east, at least, as Colorado. No eggs found, but I have seen scores of nests."—(The Auk, Vol. IV, 1887, p. 297.)

703. Mimus polyglottos (Linn.). [11.] *Mockingbird.*

The Mocking-bird is a permanent resident in the southern part of the Mississippi Valley. Its migrations are not great. In winter it retires but a short distance south of its northern breeding range, and in spring is rather late in returning. The Gulf States constitute its true winter home, and there it is found in abundance. Many individuals remain much farther north, and are to be seen occasionally during cold weather. In the winter of 1883–'84 at Caddo, Ind. Ter., it was seen about half a dozen times; at Saint Louis, Mo., one was seen January 29, 1884, and even so far north as Burlington, Iowa, it was twice seen during the winter. It is possible that these last were escaped cage birds, but there was nothing in their actions to indicate it. Mocking-birds began to leave winter quarters about the middle of March, 1884, reaching latitude 37° March 20, and occupying almost a month in their journey from that point to latitude 39° in Missouri, which they reached April 14. In Kansas, however, it was long delayed. At Manhattan, "in 1883, it arrived April 10, but in 1884 cold rains prevented its early appearance, and the first was not seen until May 22, and then only two or three pairs came. Usually it is common." The normal northern limit was reached the first week in May. In the Southern States the song period began about March 1, but it was almost June before the northernmost birds found their voices. North of latitude 40° there are only a few records of the birds' summer residence, and these are in central and southern Iowa.

In the fall of 1884 the last Mockingbird left Mount Carmel, Mo., October 21, while the bulk left October 10. At Shawneetown, Ill., a single bird was reported as staying all winter, and at Peoria, Ill., the species has been seen in midwinter. At Gainesville, Tex., some Mockingbirds spent the winter of 1884-'85.

In the spring of 1885, at Gainesville, Tex., the number present during winter was increased March 6 by the arrival of the first migrants, and the species had become common by March 31. Mockingbirds reached Pierce City, Mo., April 17; Peoria, Ill., April 19; Griggsville, Ill., April 21; Saint Louis, Mo., April 24; Mount Carmel, Mo., May 2, and Manhattan, Kans., April 26.

In the fall of 1885 the last was seen at Saint Louis, Mo., October 24. Mr. Lloyd states that it is an abundant resident in Tom Green and Concho Counties, Tex.

704. **Galeoscoptes carolinensis** (Linn.). [12.] *Catbird.*

A common summer resident throughout the Mississippi Valley and Manitoba; rare in southeastern Texas (Nehrling). In the spring of 1884 fifty-one observers contributed notes upon the movements of the Catbird. It was reported as a winter resident at Waverly, Miss., and at San Angelo, Tex. At the latter place it was marked "occasional."

Its northward movement in migration does not take place until the weather becomes warm and settled. Curiously enough, its first apappearance in 1884 was reported from Danville, Ill. (lat. 40° 08′), April 3; while at Rodney, Miss. (lat. 31° 52′), it was not reported until April 13. April 18 it was noted at latitude 41° 10′ in Illinois; and April 20 at latitude 40° 50′ in Iowa. Five days later one was observed at Saint Louis (lat. 38° 40′).

Looking at these few records and knowing little of the state of the weather during these three weeks of April, one would imagine that the Catbird was exceedingly erratic in its movements; and a further study of the records might do little towards dispelling this opinion.

Taking the eastern line of migration, from Mississippi to Wisconsin, we find a general advance about April 29. On that day and the next it was reported at various stations in Illinois, from Hillsborough (lat. 39° 12′) to Chicago (lat. 41° 51′). By May 7 the van had reached West Depere, Wis., and the bulk had arrived at Hillsborough and Polo, Ill. It was reported as arriving at Green Bay, Wis., May 8, and the bulk reached the same place May 15. West of the Mississippi the earliest arrival was reported from Burlington, Iowa, April 20. April 26 the bulk arrived at Pierce City, Mo. April 28 Catbirds had appeared at Fayette, Mo., and Manhattan, Kans., while at Saint Louis they were still scarce. April 29 the bulk appeared at Saint Louis, at which place both sexes were at breeding stands, and flocks of transients were present. April 30 the first was reported from Des Moines and Coralville, Iowa, while the bulk arrived at Manhattan, Kans. On the same day they first appeared at Oak Point, Manitoba. This last must be either a mistake or an extraordinarily early record. A delay of nearly a week in the general movement followed. May 8 the first was noted at Ames and La Porte, Iowa, and at Vermillion, Dak.; May 9 at Minneapolis, Minn.; May 11 at Elk River, Minn.; and May 17 at Frazee City, Minn. In all cases the bulk followed within a week after the first individuals had been seen. Farther west, on the plains, where fewer individual of these species are met with, they were reported as arriving somewhat later. At Gainesville, Tex., they appeared May 12, and remained about two weeks. At Alda, Nebr., the first arrival was May 14, while at Ellis, Kans., farther west, and in latitude 38° 55′, they were not seen until May 25. The notes received from observers contained little more than the dates of first appearance and the arrival of the bulk. The few records from near the southern border of the district leave us in doubt as to the extent to which Catbirds wintered in that section; but we know from previous records that they are somewhat common in the Gulf States east of Texas, and occasionally in mild winters a few have been found in southern Illinois; but in Texas, even in the southern part, the Catbird is rare during the winter, and not very common during migration or in summer. The notes from Mr. Widmann, of Saint Louis, are in striking contrast to those of most observers. They read:

> April 25, first one mewing; April 28, still scarce; April 29, bulk arrived; May 5, height of season, great numbers present, chasing, singing, mewing, fighting, bulk of transients present; May 8, bulk of transients departed; May 10, building.

The Catbird is also reported as building at Manhattan, Kans., May 9.

In the fall of 1884 only four notes were contributed on the migration of the Catbird. At Williamstown, Iowa, the bulk departed August 28, and the last was seen September 11. At Unadilla, Nebr., the last was seen August 9; at Des Moines, Iowa, September 24; and at Mount Carmel, Mo., September 22; the bulk having left one week previously.

In the spring of 1885, the earliest record of the movements of this species came from the northern edge of its usual winter home. At Corinth, Miss., the first was seen April 9, but no more until April 14. By April 17 they were reported at Shawneetown, Ill., probably coming with the warm wave which culminated there the night before. At Saint Louis, Mo., they were first seen April 20; and at Paris, Ill., April 22. With the exception of two stragglers seen at Manhattan, Kans., April 21, no record of movement at this time was made in the country west of the Mississippi River. The birds rested until the pronounced warm wave of the last few days of the month, and then moved forward. Records were received of its presence, April 28 and April 29, at Peoria, Aledo, and Hennepin, Ill.; Keokuk, Iowa; Glasgow, Mo., together with a note on its second arrival at Manhattan, Kans. The first was recorded May 1, at Reeds and Mount Carmel, Mo., and by both of the observers at Fayette, Mo., indicating that there was a special movement in Missouri on that date. The Catbirds did not rest very long before the next movement. Their advance may be seen from the following dates: They reached Richmond, Iowa, May 2; Mount Pleasant, Iowa, and Tampico, Ill., May 3; Chicago, Ill., Rockford, Ill., and Leeds Center, Wis., May 4. During the cold weather of the second week of May odd records were made at Grinnell and Waukon, Iowa; Delavan, Wis., and Lanesboro, Minn., where Catbirds were seen May 7 and May 8; on May 12 they were reported from Williamstown, Iowa; Rochester, Minn., and Stoughton, Wis. Early birds had been seen at Lake City, Minn., May 3, and at Elk River, Minn., May 6. The regular advance did not reach these places until May 15, on which date it was reported also at Hastings and Minneapolis, Minn., and River Falls, New Richmond, and Green Bay, Wis. The next day (May 16) about twenty were seen at White Earth, Minn. During the cold period the bulk overtook the advance guard, so that by the middle of May the van and bulk were moving almost together. This is shown by the fact that while May 15 marked the arrival of the first at the above-named stations, enough more came the next night to make the species common May 16. May 20 they were recorded as arriving at Huron, Dak. No reports were received from the region between latitude 45° and latitude 49°, but May 25 and 26 they occupied the whole of Manitoba to latitude 50° 30′.

In the fall of 1885 the last Catbird left Elk River, Minn., September 12; Des Moines, Iowa, September 18; and Mount Carmel, Mo., September 10. At Saint Louis, Mo., they were numerous from September 16 to 26; the bulk left September 29, and the last followed October 6. Very late migrants were seen at Milwaukee, Wis., October 24, and Fayette, Mo., November 20; while at Bonham, Tex., where they had been reported during the three previous winters, not a Catbird was seen during the winter of 1885–'86.

705. Harporhynchus rufus (Linn.). [13.] *Brown Thrasher.*

The Brown Thrasher is a common summer resident throughout the Mississippi Valley and Manitoba, and winters in the Gulf States and southward. In 1884 reports upon its migration were received from 85 observers. The species is so easily recognized that it is not likely to be overlooked, but its movements on its first arrival are so stealthy and retired that it may be present for several days without being observed, unless the weather is fine. In the winter of 1883–'84 it was reported as a winter resident at Waverly, Miss., Mermenton, La., and Abbeville, La., being abundant at the two last-mentioned places. At Corinth, Miss., a single bird was seen December 28, 1883, and January 10, 1884. The observer adds that they were never seen there before during thirty years residence. They have been known to winter as far north as southern Illinois. The first record of its appearance north of Mississippi and Louisiana in 1884 was made at Danville, Ill., March 15.

This was probably a straggler. The first general movement took place about March 22. On that day a single male, in high plumage, but silent, appeared at Saint Louis. The following day three males were observed at their old stands, in song. The same day (March 23) it was reported from Odin and Carlinville, Ill.; and April 1 from Hillsborough and Griggsville, Ill. April 4 the bulk arrived at Reeds, Mo., and April 10 at Mount Carmel, Mo. April 12 the first arrived at Linwood, Nebr. Two days later the bulk reached Saint Louis, Mo. April 17 the first appeared at Manhattan, Kans., and April 19 at Coleta, Ill. This date was the height of the season at Saint Louis, Mo., where the number was swelled by the presence of both transients and summer sojourners. A decided northward impulse was observed during the next week. April 21 the first arrived at Richmond, Iowa; and April 26 at the following places: Polo, Ill.; Des Moines, Iowa; Iowa City, Iowa; Grand Junction, Iowa; and Hastings, Minn. April 27 the first was seen at Lanesboro, Minn.; April 28 at Lake Mills, Wis.; and April 30 at Red Wing and Elk River, Minn. On the same day the bulk arrived at Grand Junction, Iowa; Lanesboro, Minn.; and Manhattan, Kans. These movements show that the line of heaviest and earliest migration was along the Mississippi River. Thence it spread up the valleys of the rivers and streams tributary to it. Migration seemed to be at its height about the end of April. May 1 the first arrival was noted at Green Bay, Wis., and the bulk arrived at Elk River, Minn. May 5 Brown Thrashers were seen at Vermillion, Dak.; May 13 at Huron, Dak.; and May 21 at Oak Point, Manitoba. Only one note of its breeding was recorded. This was at Saint Louis, Mo., where young were found as early as May 30. At Manhattan, Kans., they were building May 9.

In the fall of 1884 the following records were received of the southward movements of the Brown Thrasher: At Williamstown, Iowa, the bulk left August 18, and the last August 29; at Unadilla, Nebr., the last was seen August 23; at Des Moines, Iowa, September 17. The bulk left Mount Carmel, Mo., September 20, and the last September 26. The first reached Gainesville, Tex., September 26.

In the spring of 1885 no notes were contributed on its movements until it reached southern Illinois. It arrived at Shawneetown March 27. At Saint Louis, Mo., the first came April 2, two days earlier than it was reported at Paris, Ill., to which place it was carried by a tremendous bird wave, which reached there the afternoon and evening of April 4. To the westward of Saint Louis the birds waited for the next warm wave, reaching Glasgow, in north central Missouri, April 6. In the Ozark Hills, in southwestern Missouri, they were reported as arriving at Pierce City and Reeds April 4. Still farther west, in east central Kansas (at Richmond and Manhattan), they did not put in an appearance until April 15. The only station in the vicinity of the Mississippi River at which they were reported between latitude 39° and latitude 41° was Griggsville, Ill., where they were seen April 11. As this date and locality coincided with the maximum of a warm wave, it may be supposed that this wave carried the van to latitude 40°.

The next movement was quite regular. It began at Ferry and Mount Pleasant, Iowa, April 19; the next day extended to Iowa City, Iowa, and crossed the river to Aledo, Tampico, and Hennepin, Ill.; while the third day a great rush brought the birds to Des Moines, Coralville, Grinnell, and Newton, Iowa, Rockford, Ill., and Lanesboro and Lake City, Minn. This was one of the most pronounced movements of the whole season of migration, and it was carried still farther forward on April 22 and April 23, by the arrival of Brown Thrashers at Milwaukee, Lake Mills, Leeds Center, Ripon, and Durand, Wis., and Minneapolis, Minn. At Elk River, Minn., the first was seen May 1. On the plains the advance was about two weeks later. Linwood, Nebr., was reached April 24; Huron, Dak., May 15; and Shell River, Manitoba, May 23.

In the fall of 1885 the last Brown Thrasher left Elk River, Minn., September 12; Des Moines, Iowa, September 16; Grinnell, Iowa, September 28; and Mount Carmel, Mo., October 10. At Saint Louis, Mo., they were numerous from September 16 to 26; the bulk left September 29, and the last October 16. At Bonham, Tex., where they are common winter residents, the first came September 19, and they had become common by November 19.

706. Harporhynchus longirostris (Lafr.). [13 a.] *Long-billed Thrasher.*

An inhabitant of eastern Mexico and the valley of the Lower Rio Grande in Texas, where it is an abundant resident (Merrill; Sennett).

707. Harporhynchus curvirostris (Swains.). [15.] *Curve-billed Thrasher.*

The home of this species is on the table-lands of Mexico, and thence north to the valley of the Rio Grande River in Texas. It is a common resident on the Lower Rio Grande, and is found as high up as Eagle Pass, where it breeds abundantly.

713. Campylorhynchus brunneicapillus (Lafr.). [54.] *Cactus Wren.*

In our district this species is found in western Texas only. At Eagle Pass it is resident, and began nest-building February 26, 1884.

In the fall of 1885 three specimens were secured at San Angelo, Tex., which is a northern locality for the species. In May, 1886, Mr. Lloyd found young at Saragossa P. O., Tex., which is in approximately the same latitude as San Angelo, but farther west. He says that it is probably resident on the plains in Tom Green County.

715. Salpinctes obsoletus (Say). [58.] *Rock Wren.*

The Rock Wren occurs from the Plains to the Pacific, and is supposed to breed throughout most of its range. A few notes concerning it were received from the western part of the district, and it is known that the species migrates principally west of the 99th meridian. It has been taken once in Decatur County, Iowa, and there is a record that a "Cañon Wren," probably this species, was shot among the rocky bluffs of the river at Kansas City, Mo. In the western part of Kansas it is found at Ellis as a common summer resident. At San Angelo, Tex., it was given merely as a winter resident, arriving from the North September 10, in 1883, and leaving May 10, in 1884. Some distance southeast, near Boerne, a female was shot March 4, 1880 (Brown).

717. Catherpes mexicanus (Swains.). [59.] *White-throated Wren.*

This Wren is resident in Mexico and southern Texas.

717a. Catherpes mexicanus conspersus Ridgw. [59a.] *Cañon Wren.*

The Cañon Wren inhabits the southwestern United States from western Texas and Colorado westward. During the winter of 1879–'80 Mr. N. C. Brown discovered about three pairs in a cañon on Cibalo Creek, near Boerne, Tex.; and Mr. William Lloyd found it common at Fort Davis, Tex.

718. **Thryothorus ludovicianus** (Lath.). [60.] *Carolina Wren.*

An abundant resident in the southern portion of the Mississippi Valley. Its movements in migration are very slight, and are confined to the northern portion of its range, namely, southern Nebraska, southern Iowa, and northern Illinois. The few individuals that find their way to these sections retire southward in winter, and a slight decrease in numbers during the winter is also discernible south to about latitude 38°; below this there is no change. This species belongs more particularly to the East, being seldom found west of longitude 99°. In Kansas, where it is resident, it is abundant in the eastern but rare in the western part of the State (Goss).

The form of the species once recognized as Berlandier's Wren (*Thryothorus ludovicianus berlandieri*), but not now considered distinct, occurs in southwestern Texas. It was somewhat common at San Angelo during the winter, and one or two were seen every few days until May 6. It probably breeds, though Mr. Lloyd has not yet found any nests.

719. **Thryothorus bewickii** (Aud.). [61.] *Bewick's Wren.*

The distribution of this species over the Mississippi Valley is very irregular. Abundant in some places and rarely or never seen in contiguous territory, it seems to be governed by fancy in the choice of a dwelling place. Like the Carolina Wren, it is not strictly a migratory species, but leaves the northern portions of its range and winters from southern Illinois southward. In summer it is exceedingly abundant in southern Indiana and some parts of Illinois, being the common "House Wren" to the exclusion of *Troglodytes aëdon.* The same is true of eastern Texas, and of some places in Missouri. West and north of these States it is not common. It is not common in Kansas, and is rare in Nebraska. Dr. Hatch's note for Minnesota, stating that it is "common in summer," would better express the facts did it read: "Not uncommon during summer in a few localities in the southern part of the State." Its limited migration is performed in the last week of March and the first few days of April.

In the spring of 1885, at Gainesville, Tex., the first Bewick's Wren was reported March 6, and the next March 28. At Pierce City, Mo., the first was seen March 31. At Saint Louis the first was seen March 30, and the species became common the next day.

719 b. **Thryothorus bewickii bairdi** (Salv. & Godm.). [61b.] *Baird's Wren; Texas Bewick's Wren.*

An abundant resident in Texas, and not uncommon in southwestern Kansas (Goss). At Caddo, Ind. Ter., only 30 miles north of the Texas line, specimens of Bewick's Wren killed in December, when the species was most common, apparently were typical *bewickii.* It disappeared in the early spring, but the people of town said it would come again and be the House Wren of the summer. As the Texas form is known to be abundant only a few miles southward, it seems probable that the winter birds are typical *bewickii* and the summer birds *bairdi.* A change of residence on the part of the author prevented the exact determination of the matter. At Caddo, neither *Troglodytes aëdon* nor its western subspecies has been found. Mr. Lloyd states that Baird's Wren raises two broods in western Texas, where it is an abundant resident.

721. Troglodytes aëdon Vieill. [63.] *House Wren.*

The House Wren is a bird of the Eastern States, ranging west to the Mississippi Valley. In looking over the notes contributed on this species it has been found necessary to cut out 35 per cent. as being of uncertain identity. The House Wren is so commonly confounded with the Winter Wren that the records of its movements are perplexing and not very reliable. Information is needed concerning the northern limit of its winter range in the Southern States west of the Mississippi River. East of the Mississippi it is reported as regularly resident up to latitude 35°, and occasionally still farther north in heavy bottom lands. In migration, in the spring of 1884, it reached latitude 37° in Missouri the last week in March; latitude 38° 40′ in Missouri April 19; latitude 39° 19′ in Illinois April 25; and latitude 39° 12′ in Kansas April 24. After this the advance seems to have been very rapid, for the species arrived at latitude 46° 33′ in Minnesota May 3, and at Oak Point, Manitoba (latitude 50° 30′), near the limit of its northward journey, May 17. There is quite a strong intimation that the migration through eastern Illinois and Wisconsin took place from a week to ten days earlier than the movement in corresponding latitudes west of the Mississippi, but in the present uncertainty as to which species of Wren was actually seen no positive statement can be made.

In the fall of 1884 the bulk of House Wrens left Des Moines, Iowa, August 28, and none were seen there after that date. At Shawneetown, Ill., a single bird was reported as having been seen all winter.

In the spring of 1885 the records of the House Wren and the Winter Wren in migration were hopelessly mixed. The two Wrens appear to have migrated more nearly at the same time than usual, thus increasing the confusion of the records. All that can be safely said of the House Wren is that it was one month (from April 17 to May 17) in passing from Saint Louis, Mo. (latitude 38° 40′), to Oak Point Manitoba (latitude 50° 30′). The A. O. U. Check-list gives the habitat of the typical House Wren as "Eastern United States and Southern Canada, west to Indiana and Louisiana." The subspecies *parkmanii* is given as ranging in "Western North America, from Texas, Illinois, Minnesota, and Manitoba westward; north to Great Slave Lake, south to Jalapa, Mexico, and Lower California." According to these habitats, both of the localities mentioned, Saint Louis and Oak Point, belong to the western subspecies, and the same would be true of most of the records received under the name of the House Wren. It will be noticed that in the notes for 1884 it is said that there is an intimation that migration in Illinois and Wisconsin was a week or ten days earlier than that west of the Mississippi River. The same thing, in a still greater degree, appears in the notes for 1885. The records from eastern Illinois and Wisconsin, from such reliable observers as Mr. Balmer, Mr. Ingram, and a half dozen others, are fourteen days earlier than from corresponding latitudes in Missouri and Iowa. Now, if in these records for both years the House Wren and not the Winter Wren was the bird really seen, it follows that there is a clearly marked difference in the times of migration of the eastern and western House Wrens. To fully determine this point the records of the observers in the district east of the Mississippi Valley would have to be consulted and a careful series of observations made with reference to this particular point. The case is quite similar to that of the eastern and western Meadowlarks, and is well worthy of future consideration.

In the fall of 1885 the last House Wren was reported from Grinnell, Iowa, September 27; from Des Moines, Iowa, September 26, and from Saint Louis, Mo., September 29. The first one reached San Angelo, Tex. September 11. Dr. Agersborg states that both typical *T. aëdon* and *T. aëdon parkmanii* breed in southern Dakota.

721 a. **Troglodytes aëdon parkmanii** (Aud.). [63*a*.] *Western House Wren; Parkman's Wren.*

Parkman's Wren is a bird of the Western States, coming east to the Mississippi Valley. After what has been said of the eastern form but little remains to be said of the western. Its range in a north and south direction is about the same as the foregoing, and the dates of its migration are also much the same—possibly a little later. Concerning its eastward extension, it may be said to be common in western Texas, and it was found at Gainesville in north-central Texas in the spring of 1884. It is a common summer resident in Kansas, and is common in Nebraska, Dakota, western Minnesota, and western Manitoba. It has been taken several times at Chicago, Ill. Thus its course of migration is seen to tend somewhat in a northeasterly direction.

722. **Troglodytes hiemalis** Vieill. [65.] *Winter Wren.*

Breeds from the Northern States northward. Mr. H. A. Kline tells us that it nests in the rubbish along the banks of a stream one mile west of Polo, Ill., and Mr. Preston has found it as a not common breeder in central Iowa.

This Wren can endure cold many degrees below zero, and is found during the winter in much of the heavy timber south of latitude 39°. Most of the birds winter between latitude 34° and latitude 37°. In the spring of 1884 its migration took place a week or ten days earlier than in 1883. The migrants reached latitude 39° about March 20, and then paused until April 1. From April 5 to April 12 it spread over all the country north to latitude 45°. The last left Caddo, Ind. Ter., March 25; and Saint Louis, April 11.

In the fall of 1884 the first Winter Wren appeared at Mount Carmel, Mo., September 13.

After what has been said under the head of the House Wren, it is scarcely necessary to add that the records of the Winter Wren's movements during the spring of 1885 were largely confused with those of that species. All of the notes, with one exception, were very late, and this exception came from northeastern Illinois, and probably refers to the eastern House Wren.

In the fall of 1885 the only Winter Wren seen in fall migration at Elk River, Minn., was September 30. At Mount Carmel, Mo., one was seen October 10, while at Grinnell, Iowa, it was twice seen during the first week of November.

724. Cistothorus stellaris (Licht.). [68.] *Short-billed Marsh Wren.*

The Short-billed Marsh Wren breeds abundantly in western Manitoba, and occasionally throughout the southern part of its range, but in summer the bulk of the species is north of latitude 40°. Dr. Agersborg has recorded it as a rare breeder in southeastern Dakota.

In the Mississippi Valley it is not so common as the following species, and its winter home averages a little farther north. The notes indicate that it migrated about the same time as the Long-billed.

In the spring of 1885 the first and only Short billed Marsh Wren seen at Saint Louis was observed April 28. At Fernwood, Ill., the first was recorded May 10, and at Elk River, Minn., May 16.

In the fall of 1885 the last left Elk River, Minn., September 3. At Grinnell, Iowa, the first was seen October 22, and the last October 27.

725. Cistothorus palustris (Wils.). [67.] *Long-billed Marsh Wren.*

Occurs throughout the Mississippi Valley from Manitoba to the Gulf, wintering in the Southern States, and occasionally in mild winters even in southern Illinois. It is a late migrant. In the spring of 1884 it reached Ellis, Kans., April 27, where it is a rare summer resident. Nearer the Mississippi River it arrived somewhat earlier, but it did not advance to latitude 45° till the middle of May.

Few of the observers have noted this species, since its favorite haunts are in marshes, more or less inaccessible.

In the spring of 1885 Stoughton, Ill., was the only station that sent a report on the spring migration of the Long-billed Marsh Wren. It was first seen there May 12, and next May 14, at which date it became common. The species breeds throughout its range.

It is a rare spring migrant in western Texas (Lloyd).

In the fall of 1885 the first migrant appeared at Saint Louis, Mo., September 19, and the last was seen there October 6. At Emporia, Kans., the last was seen September 26.

726. Certhia familiaris americana (Bonap.). [55.] *Brown Creeper.*

Breeds chiefly along our northern border. The migratory movements of this species are peculiar. Dr. Coues says that it is "almost stationary," and yet there is probably no individual of the species that remains in the same latitude the whole year, while it is true that a few individuals may be found far north in winter and an equal number far south in summer. The bulk of the species migrates with more or less regularity. In 1883–'84 it was found wintering in Indian Territory, Missouri, Kansas, southern Wisconsin, and "very rarely" in southern Dakota. In previous years it has been found wintering up to latitude 45°, but beyond that point none of the Mississippi Valley observers have noted it in winter. During cold weather it remains among the heaviest timber, and hence would be seen by very few of the observers, but during its migration it can be found almost anywhere. From the fact that a few individuals wintered all along the Mississippi Valley, it is very difficult to trace its spring movements with accuracy. Dr. Coues implies that it breeds throughout its range, but instances of its breeding south of latitude 41° must be very rare. Indeed there is no such case recorded from the whole State of Illinois, and all observers south of latitude 41° agree in calling it either a winter resident or a transient visitor. Mr. T. M. Trippe, in a contribution on the "Birds of Colorado," which appeared in Coues's "Birds of the Northwest," stated (p. 230):

> Abundant during the winter, from 7,000 feet up to 9,000 feet, and probably ranging considerably higher and lower. Breeds sparingly in the upper woods, within a few hundred feet of timber-line. Appears at Idaho late in the fall, and becomes very common as soon as the weather becomes cold, great numbers coming in from other regions.

There seems to be little doubt that the bulk of the species breeds in the heavy forests along our northern boundary, and for a considerable distance beyond. The spring migration in 1884 began about the middle of March, and was at its height from April 10 to April 20, at which date the species was found migrating over all the northern half of the Mississippi Valley and in British America. It arrived at Oak Point, Manitoba, April 17. The migration was completed south of latitude 45° about the 1st of May.

In the fall of 1884 the Brown Creeper was reported as reaching Elk River, Minnesota, September 25, where it was last seen October 17. It was first reported from Des Moines, Iowa, November 8; and last from Mount Carmel, Mo., September 21.

In the spring of 1885 there was no regularity in the reports of the northward migration of the Brown Creeper. The records extend from April 1 at Saint Louis, Mo., to April 15 at Elk River, Minnesota. The last was seen at Saint Louis April 26, which is a later date than it was reported from any other station.

In the fall of 1885 the nine records of migration received were irregular. They indicate that the height of migration in the upper half of the Mississippi Valley was about October 1.

Mr. Lloyd states that in western Texas it is a "tolerably common winter visitor."

727. Sitta carolinensis Lath. [51.] *White-bellied Nuthatch.*

This non-migratory species belongs more particularly to the eastern two-thirds of the Mississippi Valley. The 97th meridian very nearly bounds its western range, and beyond this line it is only met with as a straggler. It has been found in western Kansas, and was reported from San Angelo, Tex., as "resident but rare." Only a few were seen at Caddo, Ind. Ter., and fewer still at Gainesville, Tex.

727a. Sitta carolinensis aculeata (Cass.). [51*a.*] *Slender-billed Nuthatch.*

This western form of the White-bellied Nuthatch is partially migratory. Mr. Seton (now Thompson) gave it as "a rather rare summer resident in western Manitoba." It occurs in the western part of our district, has been found in the timbered tracts of eastern Nebraska, and is a rare resident at Vermillion, in southeastern Dakota.

Mr. Lloyd found it to be the prevailing form at Fort Davis, Tex., while at San Angelo, Tex., only the eastern form was noted.

728. Sitta canadensis Linn. [52.] *Red-bellied Nuthatch.*

This is a truly migratory species, but our knowledge of its movements lacks precision. In the winter-time it is found throughout the district from the Gulf of Mexico to Minnesota. In summer the bulk passes beyond our northern border. It is rare in western Manitoba. It was reported in summer from Polo, in northern Illinois; and at Newton, in central Iowa, it was recorded as a resident.*

The few notes contributed upon its movements in the spring of 1884 indicate that its time of migration in the middle districts (between latitude 39° and latitude 42°) was during the last week in April and the first week in May.

In the spring of 1885 the first Red-bellied Nuthatch was reported from Paris, Ill., May 1. At La Porte City, Iowa, one was seen April 19.

729. Sitta pusilla Lath. [53.] *Brown-headed Nuthatch.*

A bird of the southern portion of the Mississippi Valley and eastward; resident throughout its range. The most northern record in 1884 came from Newport, Ark. (latitude 35° 36′), but it has been found by Mr. Widmann as an accidental visitor at Saint Louis, and has been recorded from Ohio.

730. Sitta pygmæa Vig. [54.] *Pygmy Nuthatch.*

An inhabitant of the western United States and the mountainous districts of Mexico. According to Professor Aughey it has been found once in northern Nebraska, where it must be a rare straggler.

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*I am of opinion that these records need verification.—C. H. M.

731. Parus bicolor Linn. [36.] *Tufted Titmouse.*

A common resident throughout the southern half of the Mississippi Valley east of the plains; abundant in eastern Kansas. If this bird performs any migration, it does so merely from the more open country, which it inhabits in summer, to the nearest heavy timber. In the late fall it is a most noisy bird, but in winter the struggle for food gives it no time for "petoing." With the first sign of spring, however, it begins with redoubled energy and keeps the woods full of its clear whistle until after the young have left the nest. In the Mississippi Valley it is not common north of southern Iowa, but has been known to wander to Minnesota. At Caddo, Ind. Ter., it began to leave the bottom-lands March 3, and by March 25 was spread evenly over the country.

Parus bicolor texensis Sennett. [—.] *Texan Tufted Titmouse.*

An inhabitant of southern Texas. (For a description of this new Tit see the Auk, vol. iv, No. 1, Jan., 1887, pp. 29–30.)

732. Parus atricristatus Cass. [37.] *Black-crested Titmouse.*

Dr. Coues, in his "Birds of the Colorado Valley," says of this species: "Habitat, Valley of the Rio Grande and southward in Mexico, (p. 116). But the same year (1878) Mr. Ragsdale determined its range in the United States to be south from latitude 33° and west from longitude 98° 30′. Mr. Lloyd has ascertained that it is a tolerably common resident in Concho and Tom Green Counties, Tex., and thence to El Paso is the prevailing species. In April, 1878, its eggs were taken in Comal County, Tex., by Mr. W. H. Werden (Bull. Nutt. Ornith. Club, vol. IV, 1879, p. 76); and Mr. N. C. Brown found it "a very abundant resident" at Boerne, Texas, in 1880. (*Ibid.*, vol. VII, 1882, p. 35.) It is an abundant resident along the Lower Rio Grande (Merrill; Sennett).

Parus atricristatus castaneifrons Sennett. [—.] *Chestnut-fronted Titmouse.*

This new subspecies has been recently described by Mr. Sennett, from specimens taken in Bee County, in southern Texas (Auk, vol. iv, No. 1, Jan., 1887, pp. 28–29).

734. Parus wollweberi (Bonap.). [39.] *Bridled Titmouse.*

The home of the Bridled Tit is in western Texas and thence westward.

735. Parus atricapillus Linn. [41.] *Black-capped Chickadee.*

This Chickadee is found in the United States from western Iowa and eastern Kansas eastward, and from southern Illinois northward. It has been claimed that it is not stationary, as has been generally supposed, but that there is a migratory movement each fall and spring, so that the species is not represented in winter at any station by the same individuals which are found there in summer. Very little material has ever been collected for the settlement of this point, and the field would be a fruitful one for some patient and painstaking observer. The only light furnished on the subject, by the record of 1884, came from Saint

Louis, where transient individuals were seen passing from March 20 to March 26.* Mr. Lloyd took one in spring migration in eastern Concho County, Tex.

735a. Parus atricapillus septentrionalis (Harris). [41*a.*] *Long-tailed Chickadee.*

This is the western form of the preceding, and similar to it in habits. It is found as far east as Missouri, eastern Nebraska, and western Minnesota along the Red River, thus slightly overlapping the home of the Black-cap. Dr. Agersborg states that it is the only Chickadee found in southeastern Dakota, and Colonel Goss says it is common in western Kansas. In the South it has been found in Texas, where it was mixed with the southern Chickadee. Professor Lantz took a fine set of seven eggs April 17, at Manhattan, Kans., and the next day a set of the eggs of the Eastern form.

736. Parus carolinensis Aud. [42.] *Carolina Chickadee.*

This is a Southern species, and is supposed to be a resident throughout its range, which extends southward from southern Illinois and central Missouri. It thus overlaps the range of the Black-capped Chickadee, and in southwestern Missouri (for example, at Pierce City) all three forms are found. In Concho County, Tex., Mr. Lloyd found it once in winter, and once in spring migration. It was previously ascertained to be a resident in Comal County, Tex. (Bull. Nutt. Ornith. Club, vol. IV, 1879, p. 76); and is a common resident in eastern Texas (Nehrling).

740. Parus hudsonicus Forst. [45.] *Hudsonian Chickadee.*

Breeds in British America and is a rare visitant to the northern parts of our district. It has been recorded from Illinois, Wisconsin, and Michigan.

744. Psaltriparus plumbeus Baird. [48.] *Lead-colored Bush-Tit.*

Mr. William Lloyd has ascertained that this western Tit ranges east to our district. He saw an erratic flock of about twenty individuals at Fort Davis, Tex., during November, 1885.

746. Auriparus flaviceps (Sund.). [50.] *Verdin; Yellow-headed Tit.*

The Verdin or Yellow-headed Tit has been known for years as a resident of southern Texas. Its range extends from the valley of the lower Rio Grande westward to Lower California, and south to northern Mexico. One of our observers, Mr. H. P. Attwater, has studied its habits at a place near the extreme northeastern limit of its range. He found it resident and quite common at San Antonio, Tex. (lat. 29° 27′), where, during the summer of 1884, his party obtained about thirty skins and quite a number of nests and eggs. The nest, which is so large as to be out of all proportion to the size of the bird, is occupied all winter as a sleeping place. In journeying from San Antonio southwestward to the Rio Grande River, Mr. Attwater found these birds not numerous, but evenly distributed over all the country.

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* There is no question whatever that this Chickadee is a migrant, however, limited its migrations may be. In the District of Columbia and neighboring portions of Maryland and Virginia it is a winter visitant, never remaining to breed.—C. H. M.

748. **Regulus satrapa** Licht. [33.] *Golden-crowned Kinglet.*

A migrant in the Mississippi Valley, possibly a few breed in northern Minnesota. This species is much less numerous than the Ruby-crowned Kinglet, and is seldom seen in real flocks. It is, however, a much hardier bird, and winters over most of the United States south of latitude 40°, and a little farther north in the mountainous portions of the East. This of course means in suitable localities, which are heavily wooded valleys. Unlike the Ruby-crowned Kinglet, it is most numerous in the middle portion of its winter habitat, but few going as far south as the Gulf. Still Mr. Lloyd tells us that a few winter in Concho County, Tex., and that it is tolerably common there in fall migration. In southeastern Texas it is common in winter (Nehrling). The van does not start northward many days in advance of the Ruby-crowns, but the transit of the bulk is much quicker, and the last Golden-crown usually leaves a locality before the other species even becomes common. Leaving out of account the very few individuals which wintered there in 1883–'84, the first migrants arrived at latitude 39° about April 1, and at latitude 45° about the middle of the month. The last left Texas before March 20, and a month later there were none to be found south of latitude 40°. Mr. Kline states that a few remain all summer in the thick swamps near Polo, Ill. (lat. 41° 58′), but that he has never succeeded in finding their nests.

In the spring of 1885 a Golden-crowned Kinglet was shot at Gainesville, Tex., March 24. A bird, probably this species, had also been seen there three days earlier. At Paris, Ill., the first was seen March 30; at Saint Louis, Mo., March 31; Chicago, Ill., April 1; Delavan, Wis., April 2; Grinnell, Iowa, April 7; Ripon, Wis., April 10; and New Richmond, Wis., April 14. The records of "lasts" were very irregular. The latest was May 13, at Durand, Wis.

In the fall of 1886 the record was quite regular. "Firsts" were seen at Lanesboro, Minn., October 2; Iowa City, Iowa, October 3; Milwaukee, Wis., October 4, and Saint Louis, Mo., October 14. The last at Lanesboro were seen October 18; at Milwaukee, October 26, and at Saint Louis, October 31.

749. **Regulus calendula** (Linn.). [30.] *Ruby-crowned Kinglet.*

Breeds chiefly north of the United States, and winters from near our southern border southward. At one station only, namely, San Angelo, Tex. (latitude 31° 22′), was this species reported as a winter resident in 1883–'84. Careful search might have revealed it at a dozen more stations, for it has been known to winter in Kansas and in southern Illinois. At Caddo, Ind. Ter., the most diligent search failed to discover a single individual, although the Golden-crowned Kinglet was common. Mr. Lloyd states that the Nueces cañon, in southwestern Texas, is the winter home of countless myriads of these birds, and that they leave very early in the spring, none having been seen after March 9, 1884. At Caddo, Ind. Ter., about a hundred were seen March 25, showing that the first came a few days before. Farther east the migration began about the middle of March, and proceeded without much regularity. April 1 found the birds at about latitude 39°, with a few stragglers a little beyond. Then the records become irregular, as if the small size of the birds allowed them to escape the notice of about half the observers until some days after their arrival. Perhaps the notes on the migration of this species will give a fair idea of the returns made by observers with reference to many of the smaller birds. From latitude 40° to latitude 41° 59′ the dates of arrival are: April 19, 21; March 30, 31; April 17, 15, 20; from latitude 42° to latitude 43° 59′: April 22, 27, 17, 5, 10, May 8; from latitude 44° to latitude 45° 59′: April 12, 21, May 11. Much of this apparent confusion can be explained by the differences in altitude and situation of the stations, while the opportunities and experience of the observer must also be taken into account. The normal arrival of the species at latitude 42° appears to have been about April 15, and at latitude 45° April 20. May 5 it arrived at Portage la Prairie, Manitoba.

Many of the observers were deceived in regard to the time of arrival of the bulk of this species. It is true that the first arrival often consists of many individuals, and that others come within a day or two, so that the species appears to be common; but the arrival of the great multitude, the real bulk, does not take place till two or three weeks later. If at that time one of its favorite haunts is visited it is found everywhere. Though scarcely breeding south of latitude 45° in the Mississippi Valley, yet it was found in Texas as late as May 1, and in the middle districts even on May 15. On the plains, as usual, it was later in migrating, reaching Manhattan, Kans., April 30, and Vermillion, Dak., May 8.

In the fall of 1884, Ruby-crowned Kinglets first appeared at Des Moines, Iowa, September 27, and for the next two days were common; they then left as suddenly as they had come. They were reported as arriving at San Angelo, Tex., October 8.

In the spring of 1885 the earliest record came from San Antonio, Tex., February 26, and the next from Gainesville, Tex., March 31. Saint Louis, Mo., was reached April 1; Paris, Ill., April 4; Mount Carmel, Mo., April 5; Iowa City, Iowa, April 6; Grinnell, Iowa, April 6; and Lanesboro, Minn., April 9. Then there seems to have been a long pause, for nearly two weeks passed before any other records were made, and these later notes were too irregular for use. At Saint Louis, Mo., the bulk was present from April 17 to April 20, and the last was seen May 5. "Lasts" were reported from Manhattan, Kans., May 6; Des Moines, Iowa, May 8; Mount Carmel, Mo., May 10; Grinnell, Iowa, May 9; Williamstown, Iowa, May 5; Waukon, Iowa, May 12; Durand, Wis., May 13; while on May 16 about two hundred Ruby-crowns were seen at White Earth, Minn.

In the fall of 1885 the record was more regular than that for the spring migration. "Firsts" were seen September 27 at Grinnell, Iowa, and Mount Carmel, Mo. At Saint Louis, Mo., the first was seen October 5; at Emporia, Kans., October 6; at Bonham, Tex., October 14, and at San Angelo, Tex., October 17. "Lasts" were reported at Grinnell, Iowa, October 10; Iowa City, Iowa, October 10, and Mount Carmel, Mo., October 12. At Saint Louis, Mo., where they were most numerous October 10 and 11, the last was seen October 23.

751. Polioptila cærulea (Linn.). [27.] *Blue-Gray Gnatcatcher.*

The southern half of the Mississippi Valley is the summer home of this species, and a few may linger in winter on our extreme southern border, but the bulk deserts the United States for a warmer climate. They have been known to occur in Minnesota, but very rarely. The most northern record received in 1884 was from Laporte City, Iowa (lat. 42° 18′). Their dispersion in the West is a little peculiar. In Kansas all the observers gave them as common in migration, but few remaining to breed, while in Nebraska they were considered rather rare. Where, then, do these abundant migrants breed?

Returning, it enters the eastern part of the Mississippi Valley in early March, but in western Texas is somewhat later. In the spring of 1884 it was seen at latitude 35° April 1, and the middle of the month at latitude 39°. The fact that these birds were near their journey's end did not occasion any decrease in their speed, for they pushed right on, and in a few days (by April 28) had reached the limit of their northward journey in northern Illinois and central Iowa.

In Texas there is a decided difference between their migration in the eastern and western parts of the State. At Gainesville, Tex., they appeared March 22, and more than a hundred were seen at Caddo, Ind. Ter., March 25. These two stations are near the valley of the Red River. Much farther south, in western Texas, they appeared later, arriving at San Angelo and Mason April 6 and 7. In the northern part of their range the species may be considered as having completed its migration and settled down to summer work about May 10.

In the fall of 1884 the bulk of Blue-gray Gnatcatchers was reported as leaving Des Moines, Iowa, August 26, and the last, three days later. The last was reported from Mount Carmel, Mo., September 6, and from San Angelo, Tex., October 5.

In the spring of 1885 it arrived at San Angelo, Tex., March 15; Gainesville, Tex., March 23; Houma, La., March 31; Corinth, Miss., April 7, and Saint Louis, Mo., April 8. An early migrant was seen at Peoria, Ill., April 13. The bulk reached Saint Louis, Mo., April 17, and the first was reported from Paris, Ill., the same day. April 18 they were seen at Emporia and Manhattan, in Kansas. Between April 20 and April 23, they appeared at Des Moines, Newton, and Grinnell, in Iowa. At New Richmond, Wis., a locality far north of the usual range of the species, it was reported May 18.

In the fall of 1885 the last was seen at Grinnell, Iowa, September 26; and at Saint Louis, Mo., September 25. None were seen at Bonham, Tex., after September 1.

752. Polioptila plumbea Baird. [28.] *Plumbeous Gnatcatcher.*

The home of this Gnatcatcher is in southern Texas and thence westward to Lower California.

754. Myadestes townsendii (Aud.). [25.] *Townsend's Solitaire.*

A rare stranger from the western United States. The only accounts of it in the Mississippi district refer to its occasional occurrence in winter. Prof. Aughey saw one on the Niobrara River in Nebraska, in 1877; January 17, 1880, Mr. Powell took a fine male at Alda, Nebr.; and later Mr. Hall saw it in southeastern Nebraska. Col. N. S. Goss gives it as "an occasional fall and winter visitant in western Kansas," where he saw ten and killed four in October, 1883. One was killed at Waukegan, Ill., December 16, 1875 (Nelson). Some of the most important of Mr. Lloyd's many ornithological discoveries in western Texas refer to Townsend's Solitaire. He not only determined its occurrence there in winter, by securing three specimens, but in May, 1886, he found its nest at Saragossa. It breeds in the Black Hills of Dakota.

755. Turdus mustelinus Gmel. [1.] *Wood Thrush.*

The several Wood Thrushes (members of the subgenus *Hylocichla*) are so commonly and constantly confounded with one another by all but the practiced ornithologist, that no more hopeless task is encountered in the whole study of migration than that of attempting to determine which species were actually seen by each observer. Many notes, believed by the observers to relate to the present species, evidently refer to the Hermit Thrush (*Turdus pallasii*), which is the earliest member of this group to migrate, and in other cases it is probable that the bird actually seen was the Olive-backed Thrush (*Turdus. swainsonii*). The Wood Thrush is a common breeder in the middle belt of the Mississippi Valley. It becomes rare toward our northern boundary. The first authentic record of the Wood Thrush in 1884 came from Saint Louis, Mo., where a single one was noted April 19. It was not seen again for a week, but April 26 the bulk of males appeared at Saint Louis, and soon after it began to be reported from more northern points. On the last day of April it was noted in latitude 39° 19′ in Illinois, latitude 38° 45′ in Missouri, and latitude 39° 12′ in Kansas, showing that on that date the line of advance was pretty nearly coincident with the 39th parallel. The normal advance seems to have reached latitude 41° May 5, and the territory between latitude 42° and latitude 43° May 7 and 8. In Wisconsin it was observed at latitude 43° 43′ May 12, but in Minnesota at about the same latitude none were seen until May

17. There are other records from farther north, but it seems probable that they belong to the Hermit Thrush. It was reported by Mr. Nash from Portage la Prairie, Manitoba, though it is very scarce in that region. The records are too indefinite to admit of tracing the movements of the bulk. The species breeds throughout its range in the district, and winters beyond our border. Dr. Agersborg states that it is a rare summer resident in southeastern Dakota, and Colonel Goss records it as abundant in eastern Kansas.

In the fall of 1884, at Des Moines, Iowa, the last Wood Thrush was seen August 25. At Mount Carmel, Mo., the bulk left September 1, and the last was seen September 14.

In the spring of 1885 the following complete records of the movements of the four species of Thrushes most commonly confounded were received, and may be of use as a table of reference.

Mr. Widmann's record at Saint Louis was as follows:

Hermit Thrush. First, April 1; bulk present from April 6 to April 18; last, April 24.

Olive-backed Thrush. First, April 17; bulk present from May 4 to May 6; last, May 20.

Wilson's Thrush. First, April 22; bulk present from May 5 to May 12; last, May 12.

Wood Thrush. First, April 19; bulk came April 28; remains to breed.

In the spring of 1884 the movements of these species at Saint Louis were as follows:

Hermit Thrush. First, April 1; bulk present from April 14 to April 19; last, April 28.

Olive-backed Thrush. First, April 26; bulk present from April 29 to May 12; last, May 26.

Wilson's Thrush. First, April 29; never common; last, May 21.

Wood Thrush. First, April 19; bulk came April 26.

In the spring of 1883 the record was:

Hermit Thrush. First not noted; bulk present April 10 to April 12; last, April 13.

Olive-backed Thrush. First, April 26; bulk present from May 2 to May 18; last, May 24.

Wilson's Thrush. First not noted; bulk present from May 15 to May 17· last, May 21.

At Jefferson, Wis., in the spring of 1883, I made the following record:

Hermit Thrush. First, April 4; bulk present from April 20 to May 6; last, May 10.

Olive-backed Thrush. Second seen May 3; bulk present from May 12 to May 24; last, May 31.

Wilson's Thrush. First, May 7; bulk present from May 12 to May 24; last, May 30.

Wood Thrush. First, May 10; bulk came May 17.

These are the only complete records received. From them it will be seen that although the exact dates are somewhat variable, the *relative* movements of the first three species remain the same for the three years and in the two widely separated localities, while the Wood Thrush shows great constancy in the time of its arrival at Saint Louis, without regard to the weather.

The records of the migration of the Wood Thrush in the spring of 1885 fell between April 19, at Saint Louis, Mo., and May 18, at Lanesboro, Minn.

In the fall of 1885, at Grinnell, Iowa, the last was seen September 16, and at Saint Louis, Mo., September 26.

756. **Turdus fuscescens** Steph. [2.] *Wilson's Thrush.*

This is rather a retired bird and one not often noticed in its late and hurried migration. It winters principally south of the United States, though a few stay in the Gulf States and Florida; hence it has a long journey to perform before reaching its breeding grounds in the northern United States and British America. In the spring of 1884 few records were made of its movements, and none whatever of its first appearance along our southern border. No notes were contributed from any locality south of Saint Louis, Mo., where two birds arrived April 29. Four birds, the highest number seen in one day, were recorded May 17, and May 21 the last one left, but managed to sing a little before its departure. A little farther up the river, at Burlington, Iowa, the first was noticed May 5, though one had been seen at Chicago, Ill., two days previously. May 11 and May 12 it reached West De Pere, Wis., and Lanesboro, Minn. A week later (May 18) it reached Oak Point, Manitoba. It breeds abundantly in Manitoba and occasionally in the Northern States, sometimes as far south as northern Illinois and Iowa. Mr. Kline took two sets of eggs at Polo, Ill., during the season of 1883; Dr. Agersborg has found it breeding at Vermillion, in southeastern Dakota, and its nest and eggs have been taken at Grinnell, Iowa.

In the spring of 1885 the notes on Wilson's Thrush were more regular than those on the other species of Wood Thrushes. At Saint Louis, Mo., and Paris, Ill., the first were reported April 22. From May 5 to May 9 they were noted at Mount Carmel, Mo., Iowa City, Iowa, Grinnell, Iowa, Lanesboro and Lake City, Minn., and Durand, Wis. May 13 they appeared at River Falls, Wis., and May 16 I saw a single bird near White Earth, Minn.

756 a. **Turdus fuscescens salicicolus** (Ridgw.). [—]. *Willow Thrush.*

This western form of Wilson's Thrush was described by Mr. Ridgway from the Rocky Mountain region of the United States. It was taken by Coues on the Souris River, along our northern boundary, and an accidental straggler came to Chicago, Ill., where it was taken September 16, 1877, by Mr. H. K. Coale. The specimen was identified by Mr. Ridgway. Recently it has been killed in Cook County, Tex., by Mr. Ragsdale. Specimens were taken at Devil's Lake and Pembina, Dak., by Mr. Vernon Bailey, in the summer of 1887.

757. Turdus aliciæ Baird. [3.] *Gray-cheeked Thrush.*

Alice's Thrush winters south and breeds north of our borders. But few notes were contributed on its movements, because few observers distinguish it from the Olive-backed Thrush. It is a common migrant in western Manitoba. The records received for 1884 can not be considered as very trustworthy since they give its appearance at about the same date (May 7 and May 8) over the region from latitude 38° 40′, in Missouri, to latitude 42° 56′, in Dakota, and latitude 44° 32′, in Minnesota. At Saint Louis the record reads: May 7, first; May 16, bulk; May 25, last. Thus its transit was more rapid than that of the Olive-backed, which arrived earlier and remained later.

In the spring of 1885 the Gray-cheeked Thrush was first seen at Gainesville, Tex., May 9. At Saint Louis, Mo., the first was seen April 24, and the last May 25. At Paris, Ill., it was first seen April 15; at Des Moines, Iowa, May 8 (where it remained only three days); and at Lanesboro, Minn., May 15. In Kansas it is a rare migrant (Goss).

758 a. Turdus ustulatus swainsonii (Caban.). [4*a.*] *Olive-backed Thrush.*

A tolerably common summer resident from Manitoba northward. In tracing this species along the three routes of migration in the Mississippi Valley, it is found that the most eastern is the earliest and the most western the latest. In the spring of 1884, at Danville, Ill., the first came April 25, and it passed north to latitude 41° 57′ as early at least as April 28. Along the middle route, just west of the Mississippi River, the first was reported from latitude 38° 40′, in Missouri, April 26, and the bulk April 29. Farther up the river, they came to latitude 43° 43′, in Minnesota, May 10, and to Minneapolis (lat. 45°) May 17. Farther west, the bulk came to Manhattan, Kans. (lat. 39° 12′), May 13, were abundant for two days, and then suddenly disappeared. Mr. Widmann furnished a very full record from Saint Louis, which is as follows:

> April 26, first; April 29, bulk arrived (small dark birds); May 5, height of the season (song often heard, the birds chasing each other as if mating); May 9, bulk continued present, dark birds; May 11, arrival of great numbers (lighter birds, probably one year old); May 13, the bulk of the species departed; May 26, last.

This species winters south of our border, and breeds principally in British America, but occasionally has been found nesting as far south as northern Illinois. At Grinnell, Iowa, its nest and eggs have been taken, and toward the latter part of the season the young are frequently seen with the parents.

In the spring of 1885 but few notes were contributed concerning the movements of the Olive-backed Thrush. The whole record from Saint Louis is as follows: "First, April 17; second, April 20; increase, April 22; arrival of bulk, May 4; most numerous, May 5; departure of bulk, May 6; last, May 20." At Gainesville, Tex., the last was seen May 19, At Manhattan, Kans., the first was seen May 12 and the last May 16. At White Earth, Minn., May 16, I saw about thirty of these birds.

In the fall of 1885 the first were reported from River Falls, Wis., September 5. It is a rare fall migrant in Tom Green County, Tex. (Lloyd).

759. Turdus aonalaschkæ Gmel. [5.] *Dwarf Hermit Thrush.*

The true home of the Dwarf Hermit Thrush is in the Pacific coast region. During migration it passes east to Nevada and Arizona, and recently Mr. Lloyd has discovered it in Concho and Tom Green Counties, Tex., where it is a tolerably common fall migrant. He states that he has seen it every day from September 20 to October 10.

759a. Turdus aonalaschkæ auduboni (Baird). [5*a.*] *Rocky Mountain Hermit Thrush.*

This western species was first found within our district by Mr. N. C. Brown, who procured it at Boerne, Tex. More recently Mr. Lloyd has taken two specimens at San Angelo, Tex., and Mr. Ragsdale has extended its range by securing specimens at Gainesville, Tex.

Mr. Lloyd's later researches have determined that this form winters near San Angelo, and that it is a tolerably common spring migrant in Tom Green County, Tex. At Gainesville, the first was seen March 20.

759b. Turdus aonalaschkæ pallasii (Caban.). [5*b.*] *Hermit Thrush.*

A common migrant in the Mississippi Valley, breeding in the northern and wintering in the southern part. The cold of winter has less effect upon this species than upon any of its brethren. It does not mind moderate cold, but dislikes snow and usually manages to keep just south of the line where snow remains on the ground for weeks at a time. Sometimes, of course, it is caught in a snow-storm, but when this happens it seeks a thick covert and endures it. The heavy undergrowth of the Mississippi bottom lands in southern Illinois offers a favorite wintering place for Hermit Thrushes, but the extreme weather of January, 1884, proved too severe for them and they left for a warmer climate. At Caddo, Ind. Ter., they remained the whole winter, but their habits were peculiar. In the May-day of their lives at the North they are shy, restless birds, ever watching for a tempting morsel, or from a low branch uttering their clear, liquid, and far-reaching notes. But in winter, in Indian Territory, they acted as if life was a burden; insensible to their surroundings, they sat stupid and silent except for a short unmusical "chick," and allowed one to approach within a few feet; if disturbed they moved but a short distance. The bulk of the species began to come from the south in the early part of March, but it is impossible to trace their movements from the notes contributed by observers. No bird has a more mixed and contradictory record, to say nothing of the many times it is confounded with the Brown Thrush and the Olive-backed. It is probable that the larger part of the notes are true, and indicate that the species is very erratic in its northward journey. The facts seem to show that during the great migration movements of the latter half of March, single individuals were scattered over much of the Mississippi Valley to latitude 44°. But these individuals must be considered as forerunners, for the regular occupation of this territory did not take place till nearly a month later. The regular migration began April 1, at latitude 39°, and by the beginning of May had advanced irregularly to latitude 45°. During the last week of April and the first part of May, the last of these birds left the lower part of this territory and soon reached their breeding grounds. Comparatively few instances have been recorded of the breeding of the Hermit Thrush within the Mississippi Valley. Outside of the mountains of Colorado the most southern breeding point on record is Alda, Nebr. (Lat. 40° 53′), from which place Mr. F. W. Powell writes that he found no nest, but saw the old birds feeding young which were too small to fly. At Grinnell, Iowa, the nest was found and identified by seeing the bird upon it. The nest and eggs are now in the Iowa College at Grinnell. At Des Moines, Iowa, they have been seen in the breeding season, but no nest has been found.

In the spring of 1885 Hermit Thrushes came to Saint Louis, Mo., the 1st day of April, and during the rest of the week were noted from Paris, Aledo, and Chicago, Ill. Another advance took place April 15 to April 18, bringing them to Newton, Iowa, and Grinnell, Iowa, Hennepin, Ill., and Clinton, Wis. North of these places the records were unsatisfactory. The only "lasts" reported were from Saint Louis, April 24, and Chicago, May 5.

In the fall of 1885 the first was observed at Saint Louis, Mo., October 5; the bulk was present October 9; and the last was seen October 11. At Lanesboro, Minn., the last was noted October 10.

In the eastern part of Concho County, Tex., Mr. Lloyd took one in spring migration.

761. Merula migratoria (Linn.). [7.] *American Robin.*

The Robin is a common summer resident in Manitoba and throughout the Mississippi Valley except in the extreme southern portion. In winter it is abundant in Louisiana and in eastern and southern Texas, it also winters irregularly over most of its United States range. It seems to be the best known bird in the Mississippi Valley, and many more notes were contributed on it than on any other species. It should be possible, therefore, to determine its movements with considerable accuracy. All through December, 1883, it was found in abundance throughout southern Illinois, Missouri, and Kansas, but the extreme cold of the first week in January, 1884, drove it farther south into its real winter home. During the larger part of this month the bulk of the Robins (probably even 90 per cent. of them) were south of the parallel of 37°. This is south of the usual winter limit of the species, the northern boundary for ordinary winters being about latitude 39°. It must not be supposed, however, that Robins never spend the winter farther north. The fact has been repeatedly demonstrated that nature has bestowed on them strong constitutions, so that if food is plenty they can withstand severe cold. Every year some of the northern observers report Robins wintering about their stations, and the winter of 1883–'84 was no exception. One was seen, January 1, in northwestern Indiana; another, January 11, at Vermillion, Dak., and finally, at Hastings, Minn., 500 miles from his brethren, "one was seen December 28, 1883, with a flock of Pine Grosbeaks (*Pinicola enucleator*), apparently at home and determined to spend the winter. It was seen repeatedly, and actually remained till spring with the same flock of Grosbeaks."

The distribution of the Robin in its winter home depends entirely on the food supply; where food is plenty, there the Robin remains, though observers a few miles away may not see one all winter. At Manhattan, Kans., berries are abundant, and during the winter of 1883–'84, as in previous years, flocks of five hundred or more individuals were constantly seen, while observers at stations but a short distance away reported no Robins from December until February. Manhattan, Kans., is the most northern station at which *flocks* of Robins remained during the winter. So far as can be learned, but few wintered in Indian Territory, nor did northern Texas fare much better; but they were reported as wintering in immense numbers along 300 miles of the cañon of the Nueces River in southwestern Texas. In Concho and Tom Green Counties Mr. Lloyd states that they are tolerably common in spring and fall, and that a few winter in the river bottoms. They were reported from all the Southern States, at some points as abundant, at others as rare.

In the early spring of 1884, as if disliking winter quarters, the Robins pushed north at the first breath of warm weather. Regardless of the certainty of being overtaken by cold, they hurried on, and from January 31 to February 3 occupied all the country from which they had been driven by the low temperature of the first of the year. This movement was confined to comparatively few individuals, and while the scouts had advanced to latitude 39°, or even a little farther north—single birds having been seen at Burlington, Iowa, (lat. 40° 50′) and at Lake Mills, Wis. (lat. 43° 06′)—the main body still remained in camp three or four hundred miles to the south. Then followed a whole month of waiting, during which time adventurous birds pressed northward, only to be driven back by snow and ice; nor was the real advance commenced until March 9. From that date until they had passed our northern boundary their advance was constant and more or less uniform. The regular advance of the van appears to have been as follows: From March 9 to 15 they spread over Illinois and eastern Nebraska to latitude 41° 51′; March 16, there was a slight advance in Iowa; March 17 and 18, no record; March 19 and 20 an advance to latitude 43° in Iowa, Illinois, and Wisconsin, but not in Nebraska; March 21, a sudden spreading over Wisconsin to latitude 45°.

By March 24 the rest of the stations in Wisconsin had reported, and an equal advance had taken place in Minnesota, so that by this date the van was at latitude 45° along the whole line. North of this all the stations are in the valley of the Red River of the North. In this valley the first arrivals reached latitude 47° April 3, and just one week later appeared at Oak Point, Manitoba (lat. 50° 30′). The fact that the spring migration on the Western plains in 1884 was several days behind the migration in the same latitude farther east is clearly shown by the record of the Robin. At Ellis, Kans. (lat. 38° 55′), the first arrived March 21, but in Illinois it reached that latitude six weeks earlier. At Menoken, Dak. (lat. 46° 58′), it did not arrive until April 29, while at Frazee City, Minn. (lat. 46° 33′), it arrived April 3; and at Larimore, Dak. (lat. 47° 52′), the high, bleak situation answers to a western position, and the Robins did not come until April 21.

The bulk of the species traveled much behind these advance guards in the lower part of the course, but moving faster than the scouts, by the time it reached the end of the march was but a few days in the rear. The bulk reached latitude 39° between March 12 and 17; then moved to latitude 43° March 23 and 24; to latitude 45° 30′ by March 27 and 28; to latitude 47° April 5, and to Portage la Prairie, Manitoba, April 20. From the few scattering notes on the subject, we may guess that the bulk left latitude 35° March 7, latitude 37° March 25, latitude 39° March 31, and latitude 41° April 10. By the middle of April, in all the country south of latitude 43°, all Robins had left those places where they did not intend to breed, and at the other places had settled down to summer numbers. This is true not only of the Robin, but also of all those species whose records are sufficiently voluminous to afford a fair guide to their movements. This overtaking of the van by the rear may be explained in either of two ways, and it is probable that both causes have some effect. The individuals forming the van always consist of old birds, and these arriving at the place where they nested the previous year stop to breed, leaving the advance to be made by those behind, giving the main body a chance to come close to the van; and, secondly, while the van is being constantly retarded by storms and cold, the rear travels in more settled weather and would naturally move faster.

In the fall of 1884 the bulk of Robins left Elk River, Minn., September 27, and the last was seen there November 7. At Hastings, Minn., none were seen after September 29. At Des Moines, Iowa, the bulk was recorded as leaving October 25, and at Mount Carmel, Mo., October 15. As already noted, many straggling Robins remain during the winter in sheltered localities much farther north than the regular winter home of the species. At Manhattan, Kans., during the winter of 1884–'85, they were as abundant as usual, while a few were noted at various points for the next 200 miles southward. A single bird was seen at Morning Sun, Iowa, February 6. One remained at Newton, Iowa, all winter; at La Porte City, Iowa, they were common all winter, and even as far north as Hastings, Minn., 400 miles beyond its ordinary winter range, two birds were seen February 27. These may have been migrants a month ahead of their fellows (the next individuals of which were seen April 1), but it is more probable that they had wintered in that vicinity, as the neighboring bluffs along the Mississippi River furnish numerous well-sheltered spots, suitable for winter quarters. Mr. Alexander Scougal, of Sioux City, Iowa, sent the following interesting note:

> Among our winter birds there is one in particular which I wish to mention. It is the male Robin. Hardly a person will believe that there is a Robin in the State during the winter; but on December 23, 1883, I shot a male Robin but took no particular notice of it except to skin it. Last December (1884), during the holidays, I took my gun and started for a dense thicket, almost impenetrable by man or dog. There I saw a number of Robins, and shot three. One of them was wing-tipped and when caught began to call, and immediately there were thirty-four Robins sitting around me, making noise enough to deafen one. I held the one in my hand for a long time so I could look at the rest; all of them were male birds; not a female could be seen. I found a house in the woods and asked the man about them. He informed me that they had been there all winter, but he was not able to distinguish males from females. I can not say positively that the female does not stay here in the winter, but I never have seen one nor heard of any here during that season; so I think it must be rarely if ever seen. The day I saw the birds was December 27, and the temperature was 22° below zero. Again, January 2, 1885, I was there and saw the Robins a second time; it was then 17° below zero. I found in their stomachs wild grapes and seeds from a small bush (probably *Symphoricarpus*). The trees in that part of the woods were covered to their top with grape-vines, and many other vines grew underneath. The birds were in good condition, and seemed as lively as in midsummer. Hence it would seem that these old birds, being the last to migrate, do not go so far south as the rest of their species, but get into these dense thickets and are unnoticed by most people, until with the first warm weather they fly out into the open fields. The first day or two of February were warm, the mercury rising to 46° above zero, and these Robins were seen by a good many people in the city. A cry went around, "Spring is coming, we have seen a Robin." But February 5 cold weather returned, and now (February 16) the thermometer ranges from eight to fourteen degrees below zero. The people wonder where the Robins have gone, but if they would go to the dense thickets of Walker's Island, on the Nebraska side of the river, they could find the same Robins as lively as ever.

The same warm wave of February 2, just spoken of by Mr. Scougal, caused Robins to appear at Vermillion, Dak., a few miles northwest of Sioux City. A large flock was seen at the same place February 7. From points south of latitude 38° records of "firsts" can hardly be taken as necessarily indicating northward migration; but the dates given when the Robins became common show when the general northward movement began.

In the spring of 1885 true migration seems to have commenced during the last two days of February and the first two days of March. Robins were not marked "common" before March 3 at any station north of latitude 39° with the exception of Glasgow, Mo., where they were so recorded February 25. Out of about twenty species of the most common birds which had been studied before this bird was taken up, there was not one whose record could compare in irregularity with that of the Robin. It is utterly impossible to find any regular movement from the notes for the first three weeks in March. It may be supposed that something like this occurred: That during the first week of March the van moved from latitude 39° to latitude 41°, in Missouri, Illinois, Iowa, and Nebraska; that during the next two weeks of cold, freezing weather, little, if any, general advance was made, but that enough adventurous birds pressed forward to thoroughly confuse the record. During the two weeks from March 7 to 21, most of the Robins abandoned winter quarters and appeared in new localities, which caused them to be recorded as common throughout the Mississippi Valley south of the parallel of 39°. On the night of March 21 the weather began to moderate and the following records of "firsts" were made during the progress of the warm wave which followed: Robins were reported at Chicago, Ill., and Milwaukee, Wis., March 22; Delavan, Wis., and Waukon, Iowa, March 23; Stoughton and Leeds Centre, Wis., and Rochester and Excelsior, Minn., March 26. During the last two days of March and the first day of April, countless thousands of birds were moving in the Upper Mississippi Valley. Among them the Robin was not a small factor, and its arrival was noted in northern and northwestern Iowa at Williamstown, Sioux City, and Emmetsburgh; at Hastings in eastern Minnesota; at Heron Lake in southwestern Minnesota, and at Durand, Luck, New Cassel, and Green Bay, Wis. Just north of these places the following line of stations reported the first April 3 and 4: Grand View and Huron, Dak.; Minneapolis (two observers), Fridley and Elk River, Minn.; and Menoken, Dak., (April 5). A 25-mile ride at White Earth, Minn., found the country quite well sprinkled with small flocks, more than two hundred in all being seen, where all the previous spring not a Robin had been found. Two days later the first Robin made its appearance at Oak Point, Manitoba, where the species was marked as common, April 9. These were probably early birds, since the other records for Manitoba are Shell River, April 13; Two Rivers, April 16; and Ossowo, April 18, and it was not considered common at any of these places before April 20. The whole record from Saint Louis is as follows: March 2, first, a summer sojourner at its stand; March 3, small troops of transients on the wing; March 5, first female at stand; March 10 to 14, the bulk of the summer sojourners arrived at their stands, and many transients passed in flocks; March 26 to April 2, the most conspicuous songster; April 2, the bulk of transients had gone north, light-colored troops still lingered; April 11 to 16, parties of transients were still with us; April 17, last flock seen.

Col. G. B. Brackett writes from Denmark, Iowa, that about the middle of April, for the last three years, immense flocks of Robins, numbering many thousands, have come to roost at night in the evergreens on his premises. They usually remained about two weeks.

In the fall of 1885, at Ossowo, Manitoba, the last Robin was seen October 20; at Elk River, Minn., October 21; River Falls, Wis., October 29; Lanesboro, Minn., November 3; Milwaukee, Wis., November 11; Iowa City, Iowa, October 26; Des Moines, Iowa, October 24; Fernwood, Ill., November 21; Fayette, Mo., October 28, and Mount Carmel, Mo., October 18. At Saint Louis, Mo., the first large flocks going south were noted September 9; from October 5 to 27 Robins were numerous; the last flock was seen October 30, and the last transient November 11. At Bonham, Tex., the first migrant came in October; the next was seen October 28, and they had become common by November. None were noted at Gainesville, Tex., until November 11.

761 a. Merula migratoria propinqua Ridgw. [7*a.*] *Western Robin.*

October 12, 1883, Colonel Goss killed two out of a flock of seven at Wallace, Kans.; and Mr. Lloyd found a single flock in winter at San Angelo, in southwestern Texas. Mr. Lloyd says they are abundant in winter west of Tom Green County in Texas.

766. Sialia sialis (Linn.). [22.] *Bluebird.*

The Bluebird breeds from the Gulf of Mexico northward to southern Manitoba. It is another familiar bird whose coming each spring is eagerly looked for, and whose movements are closely watched through the summer. Over the southern part of the United States his admirers are denied the pleasure of looking for his arrival, for he remains throughout the year. Hardy by nature, and capable of adapting himself to the food of the season, he remains at his post winter and summer. Ornithologists claim that these winter birds are not the same individuals which are seen in summer, but that the summer birds have moved southward and their places have been supplied by arrivals from the north. This of course is generally true, and yet it is also a fact that from latitude 37° southward there are occasionally Bluebirds which keep their summer stations all through the winter, and it is not safe to say that none do so even up to latitude 39°. While its winter distribution is quite similar to the Robin's, and governed likewise by the food supply rather than the temperature, yet the average winter range of the Bluebird is a little more to the north, and it is as plentiful at latitude 39° as the Robin is at latitude 37°. Mr. Widmann contributed the following note from Saint Louis, Mo.:

> In rough weather they spend much of the time in their holes, that is, Woodpeckers' holes, which they enlarge for their own use as shelters and roosting places. November 30 (1883) I watched a pair, when the female repeatedly entered the hole, brought out each time a bit of dead wood and reached it to the male, who carried it off a few yards and dropped it.

It is fair to conclude that this pair intended to pass the winter at that locality. Toward the western part of the Mississippi district the species is not common, giving place to the Rocky Mountain Bluebird (*Sialia arctica*). It is not abundant much west of longitude 97°. Immense numbers were reported in winter from southwestern Texas; and these must migrate largely to the northeast. Mr. Lloyd says the species is resident in portions of Concho County, Tex.

Throughout the winter of 1883–'84 Bluebirds remained at suitable places between latitude 37° and latitude 39°, but were driven from less favorable localities by the severe weather of January 1. They returned with the first warm wave the last of the month, and by February 1 the van approximated quite closely to the parallel of 39°. Here it came to a full stop, and made no advance until March 9. There were only five records of Bluebirds north of latitude 39° before March 9, and all these were from stations near large rivers. Starting then at latitude 39° on March 9, when the warm south wind was felt, the Bluebirds practically completed their migration before the 1st of April. To be sure, a few individuals were moving north during April and May, but the great bulk of the species stopped between latitude 45° and latitude 46°, and those which went farther north might almost be called stragglers. The impetuosity of their migration was checked, and they moved in small companies, seldom of more than a pair or two, slowly idling along as if undecided where to stop. During March their progress was as follows: By March 16 they had reached latitude 42°, by March 22 latitude 43° 30′, and by March 24 latitude 45°. There is no plainer and better attested record concerning any bird than that of the arrival of the Bluebird, March 24, all along the forty-fifth parallel in Wisconsin and Minnesota. A great change now took place in their speed. They were two months and a day in passing from latitude 45° to latitude 47°. They did not appear at Frazee City, Minn. (lat. 46° 33′), until May 25; nor was the record accidental, since the same observation has been several times recorded in former years. May 29 a pair of stragglers arrived at Portage la Prairie, Manitoba, the first Mr. Nash had ever seen in the province. They remained, and at last accounts were breeding. This is one of the most northern records for the species. Mr. Seton (now Thompson) states that it is rare in Manitoba, but most common in the region about Winnipeg.

Again, as in the case of the Robin, the extreme western records are found to be much later than the eastern. At Ellis (lat. 38° 55′), just west of Manhattan, Kans. (where the species wintered abundantly), none were seen until March 19; and at Vermillion, Dak. (lat. 42° 56′), they did not arrive until March 29. The bulk followed the first very closely, and in but one or two cases was its arrival more than three or four days later.

In the fall of 1884 at Elk River, Minn., the departure of the bulk and the last of the Bluebirds was recorded October 10; and at Des Moines, Iowa, October 25. At Mount Carmel, Mo., the last was seen October 28.

In the spring of 1885 a set of notes was received from about latitude 37°, which can be regarded as indicating either winter residence or very early spring migration. These refer to the presence of Bluebirds during the first week in February in Illinois, Missouri, and Kansas. A little farther north, at Odin, Ill., one was seen February 7. If these records indicate migration, it was at a standstill during the next three weeks, since no other evidence of movement was reported until the last two days of the month.

The bulk of males came to Saint Louis February 28, closely following the first, which had been seen there February 27. February 28 they were seen also at Mount Carmel and Fayette, Mo. The next warm wave (March 3) brought them to Paris and Griggsville, Ill., and the next day they reached Ferry, Iowa, and Aledo, Ill. March 9 was a great day for the movement of Bluebirds in southeastern Iowa, where they were reported at Morning Sun, Richmond, and Coralville, though they had been seen the day before at Des Moines and Newton, in the center of the State. They were seen also March 9, at Peoria, Ill., but the real movement in this part of Illinois took place March 14, at which date they reached Tampico (both observers), Fernwood, and Chicago, and also Clinton, Wis. At this time the van rested at latitude 42° 30′, in Illinois and Iowa, remaining there during more than a week of freezing weather, until March 26, when, according to the testimony of the reports, they spread to Williamstown, Iowa; Stoughton, Milwaukee, Leeds Center, and New Cassel, Wis.; and Lake City and Excelsior, Minn. Hardly a note was made during the next five days, and then a strong movement was noted. March 31 they reached Ripon, Wis., and Hastings, Minneapolis (two observers), and Saint Cloud, Minn. Further advance in eastern Wisconsin was strangely delayed, and the three stations in the vicinity of Green Bay did not report a Bluebird until the last week in April. In the western part of the district migration was still slower. The first was reported from Linwood, Nebr., April 27; Huron, Dak., May 16, and Oak Point, Manitoba, May 26, thus showing the peculiarity already noted in the spring of 1884, namely, that the Bluebird, after traveling in company with Robins, Blackbirds, Killdeers, Ducks, and Geese from its winter home to latitude 44°, then drops behindhand and occupies a month longer than they in performing the rest of its journey.

In the fall of 1885 the last Bluebird was reported from Elk River, Minn., October 16; from River Falls, Wis., October 13; Lanesboro, Minn., October 23; Milwaukee, Wis., October 10; Grinnell, Iowa, November 4; Fernwood, Ill., October 10; Des Moines, Iowa, October 24; Iowa City, Iowa, October 24, and Mount Carmel, Mo., October 30 Three troops of Bluebirds were seen going south at Saint Louis, Mo., September 9, and a flock of over 300, October 7.

767. **Sialia mexicana** Swains. [23.] *Western Bluebird.*

A straggler from the Rocky Mountain region. In Concho County, Tex., it is a rare winter visitor (Lloyd). At Boerne, Tex., Mr. Nathan Clifford Brown shot two specimens, each from a small flock, January 28 and March 1, 1883 (The Auk, Vol. I, 1884, p. 121). Stragglers have been recorded from Minnesota and Iowa.

768. **Sialia arctica** (Swains.). [24.] *Rocky Mountain Bluebird.*

This species is seldom found in the Mississippi district except on the high plains of the West and Southwest. It breeds in the mountains, from latitude 36° northward far into British America, and winters from

Kansas southward. It was noted by only two of our observers. At San Angelo, Tex., an immense flock was seen during the winter, and at Ellis, Kans., a few were seen during migration. Previously it was recorded as an abundant winter visitor at Boerne, Tex. (Brown). Most of the spring movement of this species occurs in the latter part of February and in March. It was found in Texas as far east as Gainesville, and has also occurred accidentally in Illinois opposite Dubuque, Iowa. It was also probably seen in the fall of 1883 at Caddo, Ind. Ter., but was not shot, hence the identification is not complete. In the fall of 1884, at San Angelo, Tex., the Rocky Mountain Bluebird first appeared October 8. Mr. Peters writes that at Bonham, Tex., he saw these birds for three or four winters in succession, the last time being in 1880.

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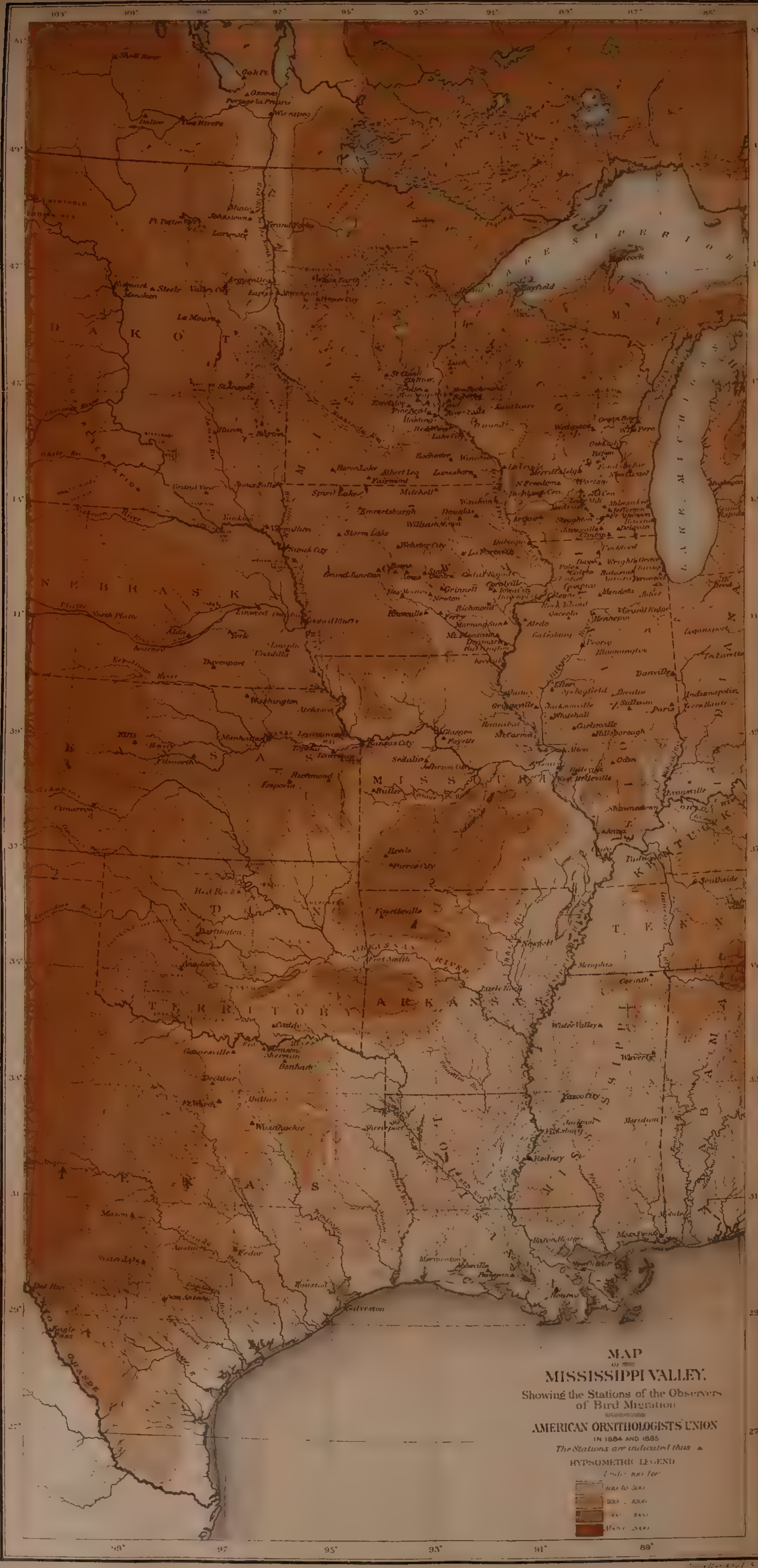
○

37°
OHIO
Green R.
Shawneetown
K E N T U C K Y
S
Anna
Cairo
Paducah
Southside
Reeds
Pierce City
KANSAS I.R.
OSAGES
PONCA
Red Rock
Cimarron River
Cimarron River
37°



MAP
OF THE
MISSISSIPPI VALLEY,
Showing the Stations of the Observers of Bird Migration
OF THE
AMERICAN ORNITHOLOGISTS' UNION
IN 1884 AND 1885

The Stations are indicated thus ▲

HYPSOMETRIC LEGEND
Under 100 feet
100 to 500
500 .. 1000
1000 .. 2000
Above 2000
103°
101°
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97°
95°
93°
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LAKE SUPERIOR
LAKE MICHIGAN
DAKOTA
NEBRASKA
KANSAS
INDIAN TERRITORY
TEXAS
MINNESOTA
IOWA
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RIO GRANDE
ARKANSAS RIVER
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Indianapolis
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Fayetteville
Pierce City
Newport
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Yazoo City
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